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Memories of the Months

SIXTH SERIES

BY THE RIGHT HON.

SIR HERBERT MAXWELL

BART., F.R.S., D.C.L., LL.D.

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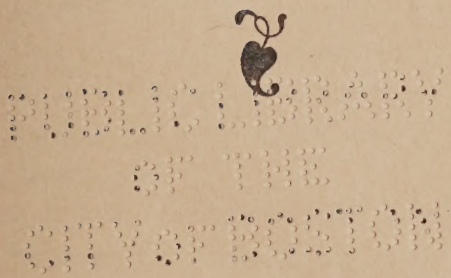

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TO THE READER

WERE this volume of a quality to merit a second or explanatory title, that should be THE MIXTURE AS BEFORE. Like its predecessors in the series, it is no more than an expansion of notes made chiefly in the open air upon incidents and phenomena, for the explanation of which, when they puzzled me, I have had recourse to the writings or oral advice of competent authorities. But whereas note-books, irregularly kept, are not convenient as jogs to a treacherous memory, I have indulged in the luxury of having their contents set up in fair type.

Five-and-twenty consecutive summers spent in attendance on Parliament having convinced me more firmly than ever that Douglas of old was in the right when he said he loved better to hear the lark sing than the mouse squeak, most of the following pages treat of what passes out of doors. Yet what are woods and fields, 'the league-long roller thundering on the beach,' the windy moorland and the falling flood, without their historic—that is, their human—association? Wherefore, standing cheek by jowl with memoranda on

animals and plants, there are some desultory gleanings from bygone history and such musings as pass through the mind of one dwelling amid rustic scenes. Pass through—aye, and so most apt to pass away, unless one pins them down before they vanish in the throng of new impressions.

HERBERT MAXWELL.

MONREITH, 1919.

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January

I

'O MIHI præteritos referat si Jupiter annos' (Oh, if Jove would but restore to me the bygone years!) —an ejaculation as futile as it is trite, but ever poignantly present with him who has let slip opportunities in gardening. It was long before some of us dwellers on the west coast of Scotland fully realised the capabilities of our climate. We used to read about the wonderful things that grew in distant Cornwall; but we followed generally the precepts of Victorian writers on horticulture, who invariably described temperature as regulated by latitude, leaving us to discover slowly that in the British Isles winter cold corresponds far more closely with longitude. Had we but been wise in time, over what lordly specimens might we be purring now, equal to those which are the reward of timely foresight and intelligence at such places as Stonefield and Poltalloch in Argyll, Castle Kennedy, Logan, and Corsewall in Wigtownshire.

Flora hyemalis

The winter of 1917-18 has been of a character to test the endurance of half-hardy plants, so frequent and violent have been the fluctuations of temperature.

Thus on the night of 7th-8th January the mercury registered 23° of cold; on the 9th it rose to 46° in the shade. It has cost us our finest bush of *Sophora* (*Edwardsia*) *grandiflora*, the winter jasmine shed its golden veil, and the crimson flush of *Rhododendron Nobleanum* was turned to ill-coloured ashes. Luckily, this intrepid hybrid always keeps plenty of flower-buds in reserve, for the return of mild conditions. As for the wych (or is it witch?) hazels, *Hamamelis mollis* and *arborea*, no amount of cold which they may have to face in the British Isles makes any effect on their crowded sprays of blossom, except to prolong the display.

At Christmastide that fine bamboo, *Thamnocalamus Falconeri*, was waving its bending wands twenty feet high; but its verdant plumes became limp and discoloured, their grace all disfigured till midsummer should clothe them afresh. This bamboo presents the solitary exception known by me to the late Lord Redesdale's test for hardihood, namely, that only those species of the giant couch grasses that have a tessellated leaf-structure can resist the rigours of our climate. He pronounced all the species with striated leaf-structure to be tender. Now the leaf of *T. Falconeri* is striated, as may be seen when it is held up against the light; yet it has weathered a dozen winters here, and is, I think, the most graceful of all bamboos, and does not spread in the outrageous fashion of some of its kindred. Such would I gladly commit to limbo if I could; but they are ill to eradicate. Twenty years ago we were seeking out choice, sheltered spots for them, little suspecting their direfully rampant nature. Now,

when we would fain devote these nooks to choicer exotics, the ground is a clotted labyrinth of roots, and the skin of the stems is so heavily charged with silex as quickly to blunt the edge of the best tempered steel.

Of all the fine berry-bearing shrubs that have been introduced of late years from the far East, none surpasses—none, methinks, excels—our native holly in beauty. It is well on to three centuries since John Evelyn sounded its praise with a profusion of italics that must have kept the compositor on the alert:

'Above all the natural *Greens* which enrich our *home-born* store, there is none certainly to be compar'd to the *Agrifolium* (or *Acuifolium* rather), our *Holly*, insomuch as I have often wonder'd at our *curiosity* after forreign Plants, and expensive *Difficulties*, to the neglect of the culture of this *vulgar*, but *incomparable* tree. . . . Is there under *Heaven* a more glorious and refreshing object of the kind, than an impregnable *Hedge of near three hundred foot* in *length*, *nine* foot *high*, and *five* in *diameter*; which I can show in my poor *Gardens* at any time of the year, glitt'ring with its arm'd and vernish'd *leaves*? the taller *Standards* at orderly distances, blushing with their natural *Coral*. It mocks at the rudest assaults of the *Weather*, *Beasts* or *Hedge-breakers*.'

In the next paragraph he says 'there is also of the *White-berried* and a *Golden-variegated*, which proceeds from no difference in the species *and Naturæ lusu*,' a sentence which, I cannot but suspect, has given rise to the tradition of a white-berried holly. Evelyn is treating here of the foliage, and probably wrote 'white-berried' for 'white-leaved' or 'white-variegated.' In a later paragraph he deals with the berries, 'of which,'

says he, 'there is a sort that bears them yellow,' and makes no further mention of white berries. It is true that both Loudon in his *Arboretum* and Koch in his *Dendrologie* write about a white-berried variety; but I have never met anybody who has seen the same. Is it possible that these high authorities yielded to the too common practice of quoting the statements of earlier writers without checking them by observation? Surely had a white-berried holly existed it would not have escaped both the eagerness of nurserymen to secure novelties and the exhaustive research of Messrs. Elwes and Henry. Though it would be impossible to improve on the normal scarlet fruit of the holly, yet is the yellow-berried variety extremely to be prized, for the hue is a rich gold, and the foliage is of a brighter green than the other.

As a rule, I cannot but think variegated foliage most undesirable. Arising as it does from a deficiency in chlorophyll corpuscles, the constituent which enables the plant to assimilate carbonic acid, the yellow or white streaks and patches which form the variegation are really blemishes like the complexion of an anæmic person. But one cannot dispense with the best varieties of variegated holly—Golden Queen and Silver Queen—their foliage being as luxuriant, their growth as vigorous, as in the wild type. Where and when these variegations originated none can tell, but they are of very ancient date.

Foresters and gardeners are not unanimous about the proper season for clipping holly hedges. The finest hedges known to me are those at Colinton House,

Midlothian, which are known to have been planted between 1670 and 1680. They form magnificent ramparts, from 30 to 40 feet high, tapering upward from a basal diameter of 20 feet and extending to a total length of 375 yards. They testify by their luxuriance at an age of 250 years to the excellence of their treatment by Mr. John Bruce, Colonel Trotter's gardener, who clips them regularly about the end of March, thereby ensuring a close young growth to mature before winter.

Faithful old John Parkinson, who dedicated his delectable *Paradisus* to Queen Henrietta Maria in 1629, passes scathing comment upon Pliny for his servile repetition of idle myths circulated by earlier writers:

'With the flowers of the holly, saith Pliny from Pythagoras, water is made ice; and againe, a staffe of the tree throwne at any beast, although it fall short by his defect that threw it, will flye to him, as he lyeth still, by the speciall property of the tree. This I relate that you may understand the fond and vain conceit of those times, which I would to God we were not in these dayes tainted withal.'

It would almost seem as if Pythagoras had some inkling of, perhaps acquaintance with, the use of the boomerang.

In singular contrast with the austerity of the season are the blossoms of the Algerian iris, most delicately tinted and finely formed of all the flowers of midwinter. It is one of the infelicitous results of the rule which binds botanists to use in classification the generic and specific name earliest bestowed upon any plant with-

out regard to its descriptive suitability that this fine iris is now known to science as *I. unguicularis*, instead of as formerly *I. stylosa*, a title much more appropriate inasmuch as it draws attention to the singular arrangement of the styles, 'which,' says Mr. W. R. Dykes, 'distinguishes it from all others of the genus.' The way to grow this charming plant is to plant it in poor sandy soil at the foot of a sunny wall and leave it alone.

The snowdrop (I speak only of the common *Galanthus nivalis*, holding other species and varieties in light esteem) is a queerly resolute little being, flowering at its own time, and no other. Unlike almost every other bulbous plant, it refuses to be forced into bloom. True, if the bulbs are potted up so that the soil may not be frozen hard, they will flower a week or a fortnight earlier than their kindred outside, if these are prevented by hard frost from pushing through the ground; but they make no response to artificial heat—hate it, in fact. They are children of the mist and the rain, multiplying exceedingly where clouds stoop low and weep often over a cool soil, but dwindling and dying out in the Isles of Scilly, whence so many hundredweight of Narcissus and other blossoms are consigned to Covent Garden in winter. Unlike the great majority of flowering herbs, the snowdrop manages to dispense with the offices of insects in fertilising the seeds which it ripens in profusion. Tennyson noted this, as he did many other byways of Nature:

> 'The ground-flame of the crocus breaks the mould,
> Fair Spring slides hither o'er the southern sea;
> Wavers on her thin stem the snowdrop cold,
> That trembles not to kisses of the bee.'

But what rule is there without exception? Once, and once only, have I seen honey-bees, tempted forth by the radiance of an early March morning, busy among the chilly snowdrop bells. But my friend Mr. E. A. Bowles tells me that bees often set to work among the snowdrops in his charming garden at Waltham Cross. Probably his snowdrops are later to flower and his bees earlier astir than ours in the humid west. Lord Avebury notes that 'Sprengel found that nectar was secreted by the green parts of the perianth, and this has been confirmed by Delpins and Knuth. It is not, however, abundant. The flowers are principally visited by hive-bees. . . . In the absence of insect visits the filaments relax, the anthers separate, and some of the pollen drops on the viscid stigma.[1]

II

I have just finished cleaning out a foul wooden pipe with the tail feathers of a woodpigeon, an operation which no smoker may pretermit who values his own health and comfort. Most of us, probably, perform the lustration with no reflection more profound than to weigh the respective merits for the purpose of the pigeon's grey pointed flight feather and its exquisitely clouded feather from the tail. For my part, I never can use either without feeling some shame in putting a structure so beautiful and complex to a use so sordid There is, indeed, an intellectual treat in store for any one who has not examined a feather under a strong lens or microscope. It is best to start with a fairly large one, say, a woodpigeon's primary or flight feather;

Feathers

[1] *British Flowering Plants*, p. 417.

for it is in the flight feathers that the qualities of strength and cohesion are brought to highest perfection.

Feathers, like the claws, the spurs, and the bill of a bird, the hooves, horns, and nails of a mammal, and the scales of fishes, are horny products of the epidermal cells of the skin. There lies before me a flight feather from a woodpigeon's wing. It consists of three principal parts—the quill or *calamus*, the shaft or *rhachis*, and the outer and inner webs.

The quill is hollow, and more or less transparent. If it is held up against the light a series of opaque objects will be seen occupying the interior of the cylinder as far as its junction with the solid shaft. Remove one side of the quill with a sharp penknife, and the opaque objects will appear as a string of little colourless caps consisting of very thin horny flakes. There are fourteen of these caps in the feather before me; they appear to be functionless—waste products of growth; but German ornithologists dignify them by the name of *die Seele*, 'the soul' of the feather.

The quill is a hollow cylinder, but the shaft which it supports is solid, quadrangular in transverse section, formed externally of strong horny substance and filled with dense white pith. It has a well-marked furrow along the under side and tapers to an extremely fine point.

Thus far the structure of this feather is fairly simple, combining the maximum of strength with a minimum of weight and material. The outer and inner webs are of far more delicate and complex character. They are composed of hundreds of *rami*, termed in English, not very appropriately, 'barbs.' Those of the outer or

forward web, which has to meet the air in flying and do battle with all kinds of weather, are much shorter and stiffer than those on the inner or rearward web. A small portion of the web on the lower part of the shaft, chiefly on the outer or forward side, consists of down, serving to protect the skin and sinews of the wing from cold. The rest of the web is made up of the aforesaid *rami* or barbs—thin, narrow plates or strips of horny material growing out of the shaft, each one individually distinct, but all so closely packed together as to form a continuous surface or 'web.' The barbs on the inner or rearward web are much longer and more pliant than those on the forward web. The inner web of the pigeon's flight feather before me, $8\frac{1}{2}$ inches in length, is made up of close on four hundred of these barbs. In the inner web of a crane's flight feather the late Professor Newton counted about six hundred and fifty barbs.

Now, however closely the barbs were packed together (it would be impossible to plant them more closely than they stand), and however firmly they were attached to the shaft (it requires a pretty sharp tug to pull them off it), they would never cling together closely enough to stand the rough work which is inevitable in flight unless further provision were made for knitting them together. Such provision is not wanting in the shape of mechanism which the deftest of human fingers are not equal to constructing. It requires a good strong lens to reveal the design.

The upper edge of each *ramus* or barb is thicker than the lower edge, and this thicker edge is furnished with an immense number of *radii* or barbules. These bar-

bules are not of the same design on both sides of the barb. Under the microscope it will be seen that those on the side directed towards the tip of the feather (termed 'distal' barbules) are furnished with a row of hooks—*hamuli*; while the barbules on the side of the barb directed towards the root of the feather ('proximal' barbules) have their ends doubled up. The hooks of the distal barbules on one barb overlap the proximal barbules on the next barb and hook themselves on to the doubled ends, thus forming a strong close web; and so the feather is complete.

The number of these barbules is so vast as to defy any but the most patient investigator. Professor Newton found that, in the crane's flight feather referred to above, every barb bore about six hundred pairs of barbules—that is, some eight hundred thousand in the inner web of the feather alone; to which must be added perhaps four hundred thousand in the outer web. Over one million barbules in a single feather! and who shall number the feathers clothing the whole bird? Nor is the marvel diminished when one reflects that this elaborate clothing is cast aside and a fresh suit provided every year of a bird's life. *Pluma haud interest*—'it matters not a feather'—ran the Roman proverb, adopting a feather as the type of all that is most trivial and of least value.

Possibly a little insight into the construction of a feather may incline one to cast about for a truer symbol of insignificance—say, the historic 'scrap of paper.' At all events, it ought to deepen the indignation with which every true and understanding lover of Nature

regards the practice of depriving birds of the power of flight by maiming them of a pinion. Upon no class of birds is this barbarity more commonly inflicted than what are called ornamental water-fowl. The commanders of some of the German prison-camps were brutal and cruel enough, God knoweth, to the poor fellows whom the fortune of war placed in their power; but I have not heard that any of them cut off a foot of a prisoner to prevent him escaping. When I walk through St. James's Park to Westminster I avoid the path that runs past the prison-yard of the pelicans, so profound is my commiseration for these grotesque, archaic noblemen, condemned to shiver through life-long detention under murky London skies, dreaming wistfully of their youth on the sun-baked shores of Nile.

If any one were to ask me why birds should have been provided with an organ of flight of such extraordinary complexity as a wing composed of feathers, instead of the relatively simple arrangement of a membrane stretched upon the digits of a bat or the exceedingly effective meshed wing of a dragon-fly, I should be at no loss for an answer, even if I thought fit to envelop it in the fine periphrasis which I once heard spoken by a witness before a Select Committee of the House of Commons. A question was addressed to him to which any common mortal might have replied 'I don't know'; but this witness, being a Civil Servant, thought it incumbent upon him to use phraseology appropriate to the dignity of his department. 'The honourable member,' said he, 'is interrogating me upon a subject, cognisance of which on my part is a matter of impossibility.'

One advantage a bird possesses over the bat or the dragon-fly, is that if the membrane of the wing of either the beast or the insect is torn or destroyed, it cannot be repaired; whereas if a bird loses its flight feathers through accident of weather or combat, it has only to wait till the next moult to receive a brand new outfit.

Now I don't know what inference my readers may draw from the contemplation of the structure I have endeavoured to describe—whether they feel constrained to recognise it as the outcome of design, the result of forces working in accordance with laws established by a Supreme Power—or whether they share the opinion of Harriet Martineau and her collaborateur Henry Atkinson, who scoffed at all believers in design as 'teleologists' and announced that 'the laws of matter are fundamental and sufficient in themselves. To call Nature's doings and the fitness and form of things *design* is absurd.' My own limited apprehension is unable to visualise any 'laws' without a lawgiver. While my poor intelligence receives no help from dogma defining with analytical precision the nature, attributes, and purpose of the lawgiver, the Athanasian Creed itself exacts less from the understanding than the dismal Martineau doctrine that 'Philosophy finds no God in nature; no personal being or creator, nor sees the want of any.'

> 'Great God! I'd rather be
> A Pagan suckled in a creed outworn;
> So might I, standing on this pleasant lea,
> Have glimpses that would make me less forlorn;
> Have sight of Proteus rising from the lea,
> Or hear old Triton blow his weathered horn.'

III

Wild Swans

It was on 25th November 1913 that, after a morning and noontide of vehement rain had cleared up an hour or so before sundown, I persuaded two ladies whom I hold in high esteem that it was not in accord with the cardinal principles of hygiene to sit any longer with their toes on the fender, forasmuch as human blood requires to have fresh oxygen pumped into it periodically if it is to retain its carmine colour. Accordingly, we set out for a brisk tramp before the early gloaming (or 'dimsey' as the Devonshire folk prettily call it) round the Sanctuary Lake.

It was a lucky hazard that turned our footsteps that way; but for that, we should have missed one of the most beautiful and unfamiliar spectacles in bird life to be seen in these islands. As we paced along the loch-side, the still air was filled suddenly with strange clamour, and, looking up, we beheld a flight of great birds. Swans —wild swans—would they alight on our lake? or would they tantalise us by continuing their flight to the bay, distant but a mile, or to one of the many other lochs and tarns in the neighbourhood? Scarcely, methought, would they venture down, for we had no time to attempt concealment; yet, as luck would have it, these fair creatures heeded not the presence of three human beings and a black terrier. They swung round in wide circles, trumpeting loudly, and lit upon the glass-calm surface of the loch about three hundred yards from where we stood. They were whoopers, nineteen of them, all, except three dusky cygnets, in

spotless white. Of course I had left my field-glasses behind; whenever I do so something of special interest is sure to present itself; but I ran back to the house for them and returned in time to inspect the visitors before dusk.

I had on former occasions and on other waters watched small companies of whoopers—three, four, or five together—but never such a noble crowd as this. The swans seemed to have had a long flight, for half of them tucked back their heads and went to sleep immediately. Not far off were half a dozen mute swans—permanent, but unpinioned residents on the loch. One should have expected them to display some emotion, were it only curiosity, on the arrival of so distinguished a company. Not a bit of it. They went on feeding subaqueously, turning themselves upside down after the manner of their kind, and paid no more attention to the travellers than if they had been a flock of mill-pond geese.

During the night these glorious visitors were joined by four others of their kind, but before midday they all took their departure. I could not get them to write their names in our visitors' book, but I inscribed them as a notable addition to the list of water-fowl that have taken advantage of our sanctuary during my time. Hitherto, though wild swans had been reported on the loch many years before, I never had the luck to view them myself. The list of water-fowl identified as resident or visitant now stands as follows:

Whooper	Shoveller	Pochard
Mallard	Wigeon	Scaup

Golden-eye	Great Crested Grebe	Bittern
Tufted Duck	Sclavonian Grebe	Coot
Gadwall	Dabchick	Waterhen
Teal	Cormorant	Water-rail
Goosander	Heron	

besides the usual shore birds—sandpipers, redshanks, snipe, etc.

Wild swans, both the whooper (*Cygnus musicus*) and the smaller Bewick's swan (*C. Bewicki*), have become much more rare in these islands than of yore, owing to the incessant warfare waged on them by professional wild-fowlers. I can't think what becomes of those that are bagged, for I do not recollect to have seen one exposed in a game-dealer's shop, and, judging from the consistency of the flesh of an old wild-goose (a year-old wild-goose is excellent), I hanker not for roast whooper. Still, a wild swan is prized by the punt-gunner much as a royal stag is by the deerstalker. So long ago as 1852, before the era of breechloaders, Charles St. John wrote: 'I saw eight pure white swans arrive on the Loch of Spynie on September 20. . . . Short as their time must have been in this land of firearms, I could plainly distinguish a large mark of blood on the side of one of them, staining its snow-white plumage.' It would be vain to try and persuade the gunner to hold his hand against these fine birds. Some years ago, when fishing No. 3 beat on the Thurso, I disturbed a pair of whoopers on the pool below Brawl Castle. They did not fly far, alighting at Gerston dam just above Halkirk, and I had much difficulty in dissuading my gillie from going for a gun, which I assured him nothing should induce me to use against

these heavenly creatures. I dare say he set me down as a spiritless ninny.

Charles St. John had a kindly feeling for wild creatures; but he took a severe toll of them, and describes more than one successful stalk after wild swans. Here again, one is puzzled to know what he did with his quarry, for he says he never ate their flesh. Moreover, the sympathy shown by swans for a wounded comrade might have touched a harder heart than his:

'I fired right and left at two of the largest as they rose from the loch. The cartridge told well on one, which fell dead in the water. The other flew off after the rest of the flock, but presently turned back, and, after making two or three graceful sweeps over the body of his companion, fell headlong, perfectly dead, almost upon her body.' [1]

I should not care to number an episode such as this among my memories of field and flood. It would haunt one uncomfortably during a wakeful night.

Yarrell records similar behaviour on the part of a bereaved Bewick's swan (*Cygnus Bewicki*):

'I was informed that when the wild swans were shot near Middleton on December 10, 1839, one of them was so reluctant to abandon the bird which was wounded on that occasion that it continued to fly about the spot for several hours after the rest of the flock had departed, and that during the whole of this period its mournful cry was heard almost incessantly.' [2]

Anguish in a tomtit or a wagtail may be keen enough when its nest is harried, yet fail to make much impression on the robber; but when it is manifested in so large and lovely a creature as a wild swan he must be a

[1] *Wild Sports of the Highlands*, ch. xxiv.
[2] *History of British Birds*, iii. 202 (ed. 1856).

hardened wretch who feels no shame for the sorrow he has wrought. Better to content oneself with the grandest display in British bird life—a flight of wild swans against a wintry sky.

Our tame—or quasi-tame—mute swans being, as aforesaid, left with full powers of flight, pass freely to other lochs and to the seashore. Not infrequently one gets shot by a shore-gunner and prized as a wild-fowl; and indeed it is not easy to distinguish between the wild and domesticated birds when flying overhead in uncertain light; but there can be no excuse for mistaking one for the other when on the water. The bill of the mute swan is orange-red, shaped like a duck's, with a black knob on the upper part between the nostrils, but the bill of the whooper is shaped more like that of a goose, and is citron-yellow for two-thirds of its length from the base outwards, the remainder being jet black. When the distance is too great or the light too bad to enable one to verify this distinction, there can be no doubt about the different attitude of the two species in swimming. Two hundred years ago, or thereby, Mr. Douglas of Fingland indited the lay which, in virtue of the charming air to which it was afterwards set, has melted hearts in all parts of the world where English is spoken or sung, though, sad to say, it failed to win him Annie Laurie for a bride. When, in the second line of the second stanza, he declares that 'her neck is like the swan,' he had in mind, no doubt, the gracefully curving neck of the mute swan, with which we are all familiar. The whooper's carriage is quite different, the head being held aloft on

a straight neck. Seldom, indeed, may one take exception to the details in Mr. A. Thorburn's exquisite bird-portraits, which are usually faultless in drawing and colour, combining breadth of handling with scrupulous fidelity in detail. Nevertheless, *aliquando dormitat*. Evidently the plate representing the whooper in Lord Lilford's *British Birds* has not been drawn from life, but from stuffed specimens. The artist has given the bird's neck those serpentine curves which I have never seen it assume in life. Nor have I ever seen a whooper puff out its wing-coverts and scapulars in the manner so characteristic of the 'cob' or male mute swan, whereby that bird so greatly enhances its value as an ornamental water-fowl. Perhaps the whooper indulges in that display in the courting season; but, as it no longer breeds within the British Isles, the ordinary citizen has no opportunity of admiring it. I cannot admit, as some persons insist, that the mute swan exceeds the whooper in beauty. It poses more carefully; like Lady Hamilton, this lady of the lake is a trained Mistress of the Attitudes; but there is an austere and dignified calm in the whooper's movements that, in my view, renders it no whit inferior in grace to the other.

The black swan of Australia is pretty generally domesticated in Britain, though it is said to be in danger of extinction in its native waters. At best, it is but a sorry caricature of the white species; its sooty plumage is the reverse of glossy, and requires all the relief that can be had from its white flight feathers and carmine bill. For many ages 'a black swan' was a

term used to express an impossible natural phenomenon; but in 1697 the Dutch navigator Willem de Vlaming, when exploring the coast, captured several of these birds on the largest river of West Australia, which thereby received and retains the name of Swan River.

Far more desirable, and far less commonly seen than the black swan, is the South American black-necked swan (*Cygnus nigricollis*), an exceedingly handsome creature with a jet-black neck and the rest of the plumage snowy white. The knob or 'berry' on the beak is bright red. As this species breeds freely in captivity it deserves more attention than it has received hitherto, though Narbrough discovered it during his voyage in 1670.

The night of 22nd-23rd March 1919 was colder than any during the preceding winter. On going down to the Sanctuary Loch about 7 A.M. I found it frozen hard across the lower end. In the middle of the ice were a pair of swans close, side by side, and frozen in. Their necks were thrown flat along their backs; the birds were quite motionless, and I thought they were dead. In the open water another pair of swans were swimming freely about. My first impulse was to get a boat and try to break a way through the ice to the imprisoned pair; but carnal appetite deterred me from what must have been a lengthy job. I had not broken my fast; visions of hot coffee and other good things presented themselves, and I passed on my way. Half an hour later, in returning along the other side of the lake, I saw the birds which I had thought defunct swimming clear of the ice in full possession of their

powers. They had been asleep when I first viewed them, though the sun had risen far above the wood. The ice was hard up against their sides, but I suppose they were as snug as any unfeathered biped might be in a four-poster. Swansdown, no doubt, is a most efficient non-conductor, but what about the naked legs and feet under the frozen water!

Since writing the above Lord Ailsa has told me of a singular happening on a sheet of water in his grounds at Culzean. A whooper arrived there some weeks ago—at the end of February—and, contrary to what I should have pronounced the *invariable* habit of its kind, has remained there, instead of passing northward after a brief rest. It was hoped that it might mate with a tame mute swan which it found on the lake, but no alliance has taken place, though the stranger is still there at the time of writing (August). I regret to add that it has been caught and pinioned. The late Lord Lilford kept both whoopers and Bewick's swans in his large collection, but although they fed, and often fought, with the mute swans at Lilford, there is no record of any intermarriage.

IV

Leek

When we were casting about during the war for home sources of food supply and discussing keenly the relative merits of what was technically, but not very appetisingly, classed as 'edible offal,' some speculation had a place in the horticultural journals about the kind of vegetables cultivated for food in early times and the approximate date of their intro-

duction to Britain. It so happens that there is good evidence of the esteem in which leeks were held, even in the more remote parts of northern Britain fifteen hundred years ago. This admirable plant, it is almost certain, was brought hither by the Roman conquerors. Celsus and Pliny sounded its praise and wrote of the high esteem in which it was held in Roman cookery. In fact the Emperor Nero earned the nickname of Porrophagus—the leek-eater—by his excessive fondness for a dish of leeks.

Now the last of the Roman garrison was withdrawn from Britain in A.D. 407. Thirteen years previously, in A.D. 394, Bishop Ninian was sent from Rome by Pope Siricius as a missionary to convert the wild Picts of Galloway. He is credited with success in the enterprise; he built the little church at the Isle of Whithorn, which became known as Candida Casa—the white house—from the contrast of its stone and lime walls with the dark wattle and daub habitations of the natives, and founded a monastery three miles inland at Whithorn. Six hundred years after Ninian's death Ailred, Abbot of Rievaulx, compiled a life of the saint, translating it into Latin from a manuscript, presumably in Gaelic, which he described contemptuously as having been composed 'by those to whom, on account of the barbarism of their native land, the faculty of speaking gracefully and elegantly was denied.' Excellent Ailred! Cordially grateful as we of a later time must ever be for thy translation, we cannot but sigh when we reflect upon the amount of local colour whereof thou didst divest the original in carrying out

thine avowed purpose of 'stripping it of the coarse garments in which it hath hitherto been hidden and attempting to deck it in those in which it may appear more comely.'

Now as to leeks. In the seventh chapter of Ailred's work occurs the following passage:

'It came to pass on a day that the holy man entered the refectory [at Whithorn] to dine with the brethren. Seeing no pot-herbs or vegetables on the table, he called the brother who had charge of the garden and asked why they had not been supplied with vegetables on that day.

'"Of a truth, O father," he replied, "it was but to-day that I dug into the ground what remained of leeks and such like, and at this season of winter the garden contains nothing fit to eat."

'"Go," said the saint, "and bring to me whatsoever thy hand shall find."

'The brother was amazed, and stood trembling, not knowing what to do. Howbeit, being well assured that Ninian would give no foolish order, he went forth slowly into the garden. Then came to pass a miracle, incredible to all men, save those who know that to true believers all things are possible. He beheld leeks and other herbs not only growing, but producing seed. He was astonished and, as if in a trance, thought he saw a vision. At last, returning to himself and calling to mind the power of the holy man, he gave thanks unto God and, gathering as much as seemed sufficient, placed it on the table before the bishop. The guests looked at each other, and with heart and voice magnified God working in his saints; and so retired, refreshed in mind even better than in body.'

The narrative does not explain whether the good bishop was patient enough to wait until the miraculous leeks were cooked before partaking of them. The

credibility of the legend (and the credulity of Ailred's readers) would not be appreciably affected were it affirmed that they were instantaneously cooked through the same supernatural agency as caused them to grow.

Having taken Ailred's chronicle down from its shelf, I squandered half an hour before restoring it to its place in skimming through some chapters. Among the various yarns which he provides for the edification of the faithful, there is one so picturesque that, although it has nothing to do with leeks, I am tempted to quote it. It is entitled *Illicita Cogitatio*—the Unlawful Thought:

'Whithersoever Ninian went forth he raised his soul to heavenly things. . . . Now it came to pass that the most reverend man was making a journey with one of his brethren then alive, also a most holy person, by name Plebia, and, as his custom was, he solaced the weariness of travel with the Psalms of David. And when, after a certain portion of the journey, they turned aside from the public road that they might rest a little, having opened their psalters they proceeded to refresh their souls with sacred reading. Presently the agreeable serenity of the weather becoming obscured by black clouds, poured down from on high to earth those waters which it had naturally drawn upwards. What more shall I say? The light air, like a chamber arching itself around the servants of God, resisted as an impenetrable wall the descending rain. But during the chant, the most blessed Ninian turned off his eyes from the book, under some influence of an unlawful thought (*illicita cogitatio*), being tickled by some desire through a suggestion of the Devil. Whereupon at once the shower, descending upon him and his book, betrayed the secret. Then the brother sitting beside him, knowing what had happened, reminded him with gentle reproof of his order and age, and showed him how ill

such things befitted such a man as he. Straightway the man of God, coming to himself, blushed that he should be overtaken by an unworthy thought, and in the same moment that he drove away the thought, the rain ceased.'

V

The Gentle Art of Blazon

Few domiciles could be more elaborately ornate and ostentatiously luxurious than the bedroom of a great railway hotel in which I was landed this morning before the sparrows began to twitter; yet no dwelling could be more heartless, or seem so utterly indifferent about the individuality of its inmate. Be you maid or matron, bachelor or benedict, 'tenth transmitter of a feeble face' or self-made man, your identity is eclipsed from the moment you enter this room, and you become No. 132, just as hundreds have done before and hundreds more will do after you. It is hardly conceivable that a feeling of home could be achieved here by dint of residence, however protracted. One ought to be grateful for warmth, light, cleanliness, and a good breakfast. Well, so I *am*, but how am I to *feel* it? 'Mine host' being a limited liability company, relations with him are necessarily impersonal and mutually deficient in warmth. Instead of exchanging greeting with him, I yield to peevishness and fault-finding.

Before me, as I write, hangs a print from a modern—very modern—picture, showing a young person with an *empire* waist sprawling in an arbour and smelling at a rose as if her life depended on it. She has taken the precaution of bringing with her a cushion covered with

sprigged silk; otherwise I 'll go bail she would not stay long on that rectilinear garden-seat. There is no objection to her sprawling—it shows off her shapely figure, trim hose, and dainty slippers; but what does offend is that the artist, desiring, I suppose, to indicate the damsel's aristocratic connection, has introduced a stone gryphon beside the terrace steps, supporting a shield displaying wholly impossible bearings. There is a cross, as there might well be; only it is not a heraldic cross quartering the escutcheon, but a sepulchral cross, such as might adorn the outside of a church hymnal; and there is a bend surcharged upon the cross —a bend sinister, too; that is, crossing the shield diagonally from the upper left corner (right as you look at it) to the right flank. Now the bend sinister is one of the rarest of all charges; not because it is, as commonly supposed, a mark of illegitimacy—that is to confuse it with a baton sinister, which is not an honourable 'ordinary' like the bend—but an abatement of honour; it is rare simply because in ninety-nine cases out of a hundred the bend dexter is displayed. Apart from that, anybody with the slightest knowledge of heraldry will perceive the impossibility of such arms as are here depicted. Heraldry is a Christian science—art—craft—call it what you will: it originated in Christian society, and was codified for the exclusive use of Christian chivalry; wherefore the cross was ever esteemed the most honourable ordinary, and it would be an unpardonable solecism to surcharge it with an ordinary or inferior honour. The painter of this picture, then, has blundered badly in dabbling with a gentle

craft whereof he has not mastered the rudiments. Heraldically, he does not know his right hand from his left, and has perpetrated an affront upon the figure of highest dignity in the art of blazon.

Now, why all this fuss, asks the reader, about a picture by an unknown artist? Why can't you look at the pretty young lady and leave out the heraldry? This invites the retort, why could not the painter leave it out? We suffer fools gladly, so long as they have the tact not to thrust their folly under our noses. Painting, it is true, has this advantage over the sister art of Music, that nobody need look at a picture unless he choose, while the sensitive ear is always liable to outrage from discord or iteration. All the same, pictures invite inspection: they are only painted to be looked at; and offence by the painter who represents things falsely—who attempts to depict what he has never studied—is as direct to the eye and intelligence as that offered to the ear and temper by the pianist who fills the house (and perhaps the next house) with excruciating renderings of compositions beyond his power. Nobody blames him who gives way to strong language under the affliction of a mangled sonata: may not a murmur be allowed to one who witnesses the desecration of the chivalrous science?

Oh, I know how I shall be set down. 'Art for art!' cries the painter; 'criticism of your kind is puerile. False heraldry well painted is finer art than the most accurate heraldry in a bad picture. Let the critic mell only with conception and execution.' Very well; so be it. Set the marriage feast at Cana in Galilee with wine

in glass bottles with corks; represent your knights with sword or lance in their left hands; pour the rays of the setting sun through the eastern apse at vespers; let the snows of Manchuria whiten the plain in your great picture of the surrender of De Wet and his Boers. Enforce 'art for art' as the universal canon, and you sound the knell of historic painting and commemorative sculpture, thereby stripping the Muse of one of her noblest functions. But don't be surprised if plain folks say unkind things behind your back.

However, that is all outside my present theme, which is suggested by certain signs of reviving interest in British heraldry. Were the world too busy to take any note of that in which, three hundred years ago, any educated person would have felt ashamed not to be well versed, one might hesitate to stir the dust which has gathered upon it since the days of the Commonwealth. If all people of means were so well provided with occupation for their redundant leisure as to avoid any recreation which could not be described as contributing to the advancement of learning or knowledge, one might be content to allow the romantic craft of heralds to slumber, undisturbed save by antiquaries and scrupulous historians. But whereas, as things are, neither business nor pleasure interferes with the devotion of a considerable amount of energy and money to pursuits and studies which, even if successful, contribute little or nothing to the general welfare. Take, for example, philately—the science of collecting used postage stamps. It is difficult to see how this can contribute grist to the historian's mill; nor can it offer

any problems for solution by the antiquary, inasmuch as there was not a postage stamp in existence a hundred years ago. Surely in a civilised community a defaced postage stamp might stand as the very type of intrinsic worthlessness; yet such has been the fictitious value created for such trash, that, as I am assured by one versed in the mysteries of this traffic, an old black penny stamp of the early 'forties will command a ransom of £5, while for a clean, unused one there are plenty of enthusiasts ready to plank down £50, or twelve thousand times its face value! Fifty years ago £65 apiece was the price demanded for postage stamps issued in the Sandwich Islands in 1852, while one of the Mauritius for 1847 brought £380 in public auction.

The fashion sprang up among schoolboys in the late 'fifties; whether it be creditable to our own system of education that it should have grown to be a passion among adults is a question which one might put, and another shirk the consequences of answering. Æsthetically, there is far more justification for the naked black's cupidity for beads.

It is now more than thirty years since a friend, now no more,[1] told me in that Temple of Truth, the House of Commons, that he had just had his collection of stamps valued at £35,000.

'Well,' said I, 'I suppose you mean to realise.'

'No,' he replied, 'I shall bequeath it to the nation.'

And, sure enough, the collection is now in the British Museum.

[1] The late Mr. Thomas Taplin, M.P.

All this would have little enough connection with heraldry were it not that out of the craze for stamp-collecting has sprung the far more intelligible (I dare not say intelligent) one of collecting book-plates; and whereas the majority of book-plates represent the armorial bearings of the owner, a new interest has been awakened in a long-neglected lore.

The study of heraldry has an advantage over all other systems—it is precise and absolutely finite. Precise, though the jargon is archaic—for the number of terms is limited and may be mastered in a week. Finite—for the rules may be laid to heart in a month or two, and when these are acquired, there is nothing more to learn. The student has added to his store a certain quantity of exact knowledge, which, indeed, may not prove of the slightest service to him in the battle of life, but may be the source of considerable pleasure and information to him in the slack intervals of fighting. Just as no hillside or river bank is dreary to anybody possessed of more than a smattering of botany, and just as every railway cutting or gravel-pit has its story for him who knows something of stratigraphic geology, so he who has stuffed heraldry into a spare corner of his knowledge-box may stroll down Piccadilly and derive more amusement from the panels of carriages than from the shop windows.

Even should one not care to 'take up' heraldry seriously, he might easily acquire such a general acquaintance with its purpose and practice as would enable him to avoid that misapplication of terms which is one of the results of prolonged neglect of the

craft. For instance, he must disabuse his mind of the vulgar employment of the term 'crest' to signify a coat of arms. The escutcheon or shield, whereon the arms are displayed, is something sacred in a sense that never applied to the crest or supporters, which of old were frequently changed according to the fancy of the bearer. Moreover, while members or branches of a common family were restricted scrupulously to the use of the arms of that family, with proper marks of cadency and difference, or *brisures*, variation in the crest has always been readily sanctioned. For example, every branch of the great family of Stewart or Stuart displays as the chief figure in its arms the blue and white fess chequy, indicating common descent from Alan *dapifer*, Great Steward of Scotland. This well-known bearing dates from early in the thirteenth century, and is supposed to represent the official belt of the Great Steward, the chequers thereon signifying the chess-board upon which primitive Treasury officials kept their accounts. In fact, our modern term 'Exchequer' simply represents the old French *eschequier*, a chess-board.

The Stewarts, therefore, wheresoever they ride, may be known by the blue and white chequers on the golden field; but the animal kingdom has been heavily taxed to supply them with crests. Lions, wyverns, unicorns, doves, pelicans, eagles, human beings—there is no end to the variety. The importance which is commonly attributed to the crest is wholly misapplied; indeed, heraldry had reached its zenith before crests had been thought of in England and Scotland. In the

thirteenth century knights bore no device upon their peaked helmets or flat-topped steel caps. If we may believe Barbour, crested helmets and cannon made their first appearance in the same campaign—that of Weardale—when Douglas and Moray invaded England in 1327:

'Twa novelryis that day tha saw,
That forsuth Scotland had been nane;
Tymbris for helmis was the tane,
That tham thocht than of gret beaute,
And alsua wondir for to se;
The tothir crakis war of wer,
That tha befor herd nevir er.
Of thir tua thingis tha had ferly.'[1]

Which, in modern language, reads:

'Two novelties they saw that day,
Which hitherto had not been in Scotland;
Timbres [crests] for helmets was the one,
Which they thought of great beauty,
And also wonderful to behold;
The other was cracks of war [cannonry]
Which they had never heard before.
At these two things they marvelled.'

Barbour's statement is corroborated by the fact that Edward III., who began to reign in that year and received his baptism of fire at Weardale, was the first King of England to display a crest over his arms on the Great Seal. It was the lion passant, guardant and crowned, which has remained ever since over the royal arms of England, except that the lion is now *statant* instead of *passant*.

There is a grievous misuse of crests in vogue, for which modern heralds are to blame: I mean the

[1] *The Brus*, cxli. 170-77.

display of two crests or more. When a man assumes the name and arms of another family, as a condition of inheriting property or acquiring it by marriage, he is under no obligation to take the crest also. Crests, like supporters, are merely exterior ornaments of the escutcheon, and to require a gentleman to carry two crests is as unreasonable as to force him to wear two hats. One may almost imagine a knight forfeiting his reputation for courage through being late for the lists, owing to inability to make up his mind which crest he would wear that day, hesitating, let us say, between a crocodile and a popinjay.

Supporters are another form of exterior ornament which came into general use at a later date than crests, and have acquired in popular estimation a measure of respect which is due to the escutcheon alone. It is no use grumbling now; but the fact is that the introduction of supporters marked a decadent stage in heraldry, which, in its purest form, made the escutcheon tell all that the science professes to convey. The shield was an integral part of operative armour; even the crest could be, and was, displayed on active service; but for supporters there never was any use, except to enhance the splendour of a knight's shield as it hung upon the barrier at the beginning of a tournament. By modern usage, supporters have been decreed necessary adjuncts to the dignity of a peer, and the right of certain commoners to display them has been recognised; but, as Sir George Mackenzie observed in his *System of Heraldry* (1680), 'they owe these to prescription, and not to the original institution of

heraldry.' Nevertheless, the prominence of supporters impresses the uninstructed beholder with the notion that they are the most important part of a coat of arms. In the royal arms of Great Britain and Ireland, for instance, 'the lion and the unicorn fighting for the Crown' quite eclipse the leopards of England, the lion of Scotland, and the harp of Brian Boruimhe. Yet, although the bearings of these three realms have remained the same for centuries, the supporters have been subject to frequent change. Henry IV. of England displayed an antelope and a swan when he was Duke of Hereford; when he became king he adopted the two angels of his predecessor, Richard II., who was probably the first king of England to use these exterior ornaments. Henry V., the hero of Agincourt, assumed a lion and an antelope; pious and ill-starred Henry VI. had two antelopes, although some, says Nisbet, have identified the animal supporting his arms on the sinister side, over the gateway of Eton College, as 'a leopard spotted proper, with fire issuing out of his mouth and ears.' Forasmuch as few persons can have witnessed a leopard suffering under so exceptional an affliction, and as the sculptor probably never saw an antelope in the flesh, it is inevitable that there should be some ambiguity about the precise animal represented. It may therefore be relegated to the same category of enigma as that wherein the Man in the Iron Mask and the author of Junius's letters have figured for so long.

Edward IV. was a hedonist in the matter of supporters, discarding one pair after another as lightly as

he would change his hose. He used in succession a white lion and a black bull with golden horns and hoofs —two lions proper—and again, a lion and a white hart. Richard III. chose two white boars; while Henry VII. struck out quite a new line, introducing a scarlet dragon, which he coupled, somewhat unequally one should say, with a white greyhound. Henry VIII. exchanged the greyhound for a golden lion, and Edward VI. placed an imperial crown on the lion's head. Queen Mary replaced the lion with an eagle, but Queen Elizabeth restored the lion as dexter supporter. Finally King James VI. and I. brought with him one of the chained unicorns which had long supported the shield of the King of Scots, and it has continued unchanged ever since, occupying the sinister side when the arms are displayed in England and Ireland, but in Scotland it holds the dexter place.

Another very common misconception of matters heraldic is to suppose that a shield of arms is honourable in proportion to the number of quarterings marshalled thereon. Herein is confusion between a shield or banner of arms and a genealogical flag, each proper in its place, but intended for totally different purposes. On a genealogical flag are marshalled the arms of those families whose blood runs legitimately in the veins of an individual. To entitle him to marshal sixteen quarters, formerly considered indispensable to qualify a man of gentle birth, he must be able to trace his lineage, paternal and maternal, through four complete generations of armorial families. Then his genealogical flag becomes a historic docu-

ment, to be displayed with entire propriety on great occasions, such as a marriage or a funeral, or for the interior decoration of a church or mansion. But it is wholly unsuitable and improper for the original purpose of a shield or banner of arms, which was to enable a knight to be easily recognised in the lists or on the field of battle. For this purpose it is obvious that the simpler his bearings were kept the better, and in all early heraldry the charges are few and distinct.

> 'At Doune, o'er many a spear and glaive,
> Two barons proud their banners wave;
> I saw the Moray's silver star,
> And mark'd the sable pale of Mar.'

The flower of English chivalry rode with Edward I. to the siege of Caerlaverock in the year 1300. The anonymous chronicler of that famous expedition chose to write in Norman-French, and is therefore not to be quoted in this place; but he describes it as an occasion of quite unusual splendour. Yet, although he blazons the banners of one hundred and six knights *brodé sur sendaus e samis*—'embroidered on silk and satin'—not one of them displayed quartered arms; each had a plain figure in distinct colours. It was the German heralds of the sixteenth century who first conceived a pedantic delight in cramming as many quarterings as possible into one shield. From Germany this spread to other continental Courts; it affected English practice to some extent, Scottish practice scarcely at all. The Lyon King of Arms in his patents has always kept the bearings as simple and the quarterings as few as possible, recognising that the ancient paternal coat can

gain nothing in honour when diluted, as it were, by conjunction with another.

There are notable exceptions, of course. The original arms of Douglas in the thirteenth century showed the two lower thirds of the shield plain white, the upper third blue, charged with two, later three, white stars. After the fatal expedition of 'Good Sir James of Douglas' with the heart of his master, David II. granted the honourable addition of a human heart to be charged upon the white field. As the house of Douglas grew in might and splendour, it was necessary to distinguish between the arms of the different branches, and this was often done by quartering the paternal coat with the arms already assigned to the various earldoms or lordships bestowed upon them. Thus the Black Douglas, having inherited the earldom of Mar, quartered the azure shield with golden bend and cross crosslets of that dignity; the Red Douglas, created Earl of Angus, quartered the hereditary lion of Angus; Douglas, Lord of Nithsdale, quartered the sable field and argent lion of that lordship, and so on. But all this was done as betokening the increment of honour; no knight ever dreamt of encumbering his shield with bearings which meant nothing but admixture of blood not more noble than his own.

Again, there could be no simpler or more conspicuous escutcheon than that which bore 'the sable pale of Mar'—a vertical black band down the centre of a white field. But this, the paternal bearing of Erskine, suffers no abatement of honour from being quartered with the ancient arms of the much-disputed earldom of Mar.

This arrangement marks the Earl of Mar as chief of the house of Erskine. But imagine another case. Suppose some future rightful heir to that almost immemorial title—one of the seven earldoms of Scotland under her Celtic kings—suppose him to 'marry the heiress of some great Hoggenheimer, who requires the bridegroom to quarter with the paternal coat the arms which he, Hoggenheimer, has been granted and transmits to his daughter. Then the full evil of quarterings will be apparent: the ancient shield will be for ever defaced by the intrusion of the Hoggenheimer bearings. In a word, an ancient coat of arms must always suffer by quartering, unless with arms of superior antiquity and dignity to itself: it is always desirable to maintain an undivided shield as long as possible. The idea that a simple coat of arms is less honourable than a multiple one may be disproved by the fact that the premier Marquis of the United Kingdom, Lord Winchester, displays only the singularly plain arms of Paulet, three swords on a sable field; and the premier Viscount, Lord Hereford, the equally simple device of Devereux, a red fess on a white field with three torteaux (red discs) in chief. So in Scotland Lord Forbes, premier baron of that realm by the creation of 1442, uses nothing but the original bearings of the name—three white bears' heads on an azure field.

Some families have borne quartered arms for so many centuries that these could not be sundered now without marring the historic association. Such is the beautiful achievement of the Earls of Eglinton, wherein for nearly seven hundred years the lilies of Montgomerie have

blossomed beside the annulets of Eglinton. Another such shield is that of the Earls of Morton, where the paternal heart and stars of Douglas are quartered with the ancient bearings of Douglas of Lochleven. But, as a rule, the inheritor of established armorial bearings should be as jealous of any addition thereto as of any infringement upon them.

It would contribute much to the beauty and effectiveness of certain shields of arms were the owners to apply for fresh patents reducing the number of quarterings prescribed at a time when heraldry had become sorely corrupted. The Duke of Richmond and Gordon's arms offer a case in point. His shield displays no fewer than thirty quarters, the arms of England and France being repeated eight times, those of Scotland, Ireland, d'Aubigny, Gordon, Badenoch, Seton, and Fraser each twice. Assuming that it is desirable to proclaim all these alliances upon a single shield or banner, the quarters should be rearranged so that none might appear more than twice. Even so, in days when heraldry was an operative part of the national military scheme, such complex bearings must have led to frequent confusion, so difficult would it have been to establish the identity of any knight riding into the lists or leading his contingent in the Sovereign's army.

Let two points be recorded to the credit of Garter and the Heralds' College. They removed the arms of France from the shield of the British Sovereign (though not until two hundred years after these had ceased to represent any real power or property), and they have wisely refused to listen to meddlesome persons who

clamour for the marshalling of Colonial arms with those of the three realms.

The importance of colours in the arms—'tinctures' as they are technically termed—was enhanced in feudal and semi-feudal times by reason that by them was regulated a knight's liveries—no mean consideration when the royal army was composed of the personal following of nobles and knights.

Take, as an example, the memorable scene at 'lousie Lauder' in 1479, when Archibald Douglas, fifth Earl of Angus, earned the sobriquet of Bell-the-Cat, by which he is best remembered. The bale-fires had been flaring from height to height, from tower to tower, along the Border, summoning gentle and simple to the accustomed duty of national defence. Dreamy, intellectual James III. had ridden from Edinburgh to put himself at the head of his army, but with him he had brought the detested Thomas Cochrane and his crew—'fiddlers and bricklayers,' as the haughty Angus called them. James had raised this Cochrane, a builder and architect, to the earldom of Mar, vacated by the suspicious death of the King's own brother in a dungeon of Craigmillar.

The barons were furious. What though the English held Berwick! the Scottish lords would not brook to march with the low-born Cochrane. Angus, as Warden of the March, summoned them to meet in Lauder Kirk, where Lord Gray pungently compared them with the assembly of mice which resolved that a bell should be hung round the cat's neck. The difficulty was to find a volunteer for that most desirable, but delicate, operation.

'I WILL BELL THE CAT!' growled the Warden; and, as he spoke, there came a loud knocking at the church door. Douglas of Lochleven, looking out, beheld the upstart Earl of Mar, with his following of three hundred stalwart fellows, all dressed in the livery of the earldom —white doublets with black bands (derived from the white shield and 'sable pale of Mar'). Cochrane himself, says quaint old Pitscottie, was gorgeously attired in a riding coat of black velvet, a heavy gold chain about his neck 'to the awaillour [value] of 500 crowns,' and a baldrick of silk and gold across his shoulder. He wore a gold-mounted hunting horn, too, set with a large beryl. 'This Couchrane was so proud in his consait that he contit no lord to be marrow [equal] to him, thairfor he raschit rudlie at the kirk dore.' He claimed admittance as Earl of Mar to the assembly of peers. Angus strode down the aisle and bade his kinsman to admit the fellow. Then the door was flung to and barred to shut out Mar's followers. Angus wrenched the gold chain from his victim's neck. 'A rope would fit it better,' quoth he. Lochleven tore off the gay horn, saying, 'Hunter of mischief hath he been ower lang.'

'My lords!' cried Cochrane, 'is this mows [acting] or earnest?'—'Hard earnest,' shouted the Warden, 'and sae ye'll find it.'

Before the summer sun had set, Cochrane and half a dozen of his fellows dangled limp in their gay coats over the parapet of Lauder Bridge.

Modern usage has transposed the meaning of 'banner' and 'standard.' What is now known as the

Royal Standard would have been termed in chivalrous times a banner of arms—the Sovereign's arms. Most people have come to associate banners with Oddfellows' fêtes and trade demonstrations, where they fulfil the function of what used to be technically called standards, bearing devices not strictly heraldic, and painted with mottoes, 'Death to Tyrants!' 'Peace and Plenty!' 'Votes for Women!' and so on, according to the nature and temper of the occasion. 'Standards,' says Boutell, 'appear to have been used solely for the purpose of display, and to add to the splendour of military gatherings and royal pageants.' But the banner of a sovereign, a prelate, or a noble was of much more serious purpose. It bore only the recognised arms of its owner, marking his exact position in the field or in column of march. It served the same end in battle as was done by the colours of a modern regiment under a system of tactics now obsolete. A trace of the ancient practice survives in our Highland regiments; the piper of each company displaying the arms of his captain on the banner of his pipes.

The standard became fashionable in the reign of Edward III., but it never displaced the banner. It seems at first to have been a voluntary emblem of knighthood, consisting of a long narrow flag, tapering either to a point or a swallowtail, usually having the cross of the national saint next the hoist, with heraldic badges and other devices, with mottoes, on the fly. In Henry VIII.'s reign the length of the standard was regulated according to the owner's degree, eight to nine yards being prescribed for the Sovereign, graduated

thence through various ranks, down to four yards for a simple knight. Four such standards have been figured and described by the late Earl of Southesk in the *Proceedings of the Society of Antiquaries of Scotland* (1901-2, pp. 246-80):

(1) The standard of Keith, Earl Marischal, carried at Flodden by Black John Skirving of Plewland, brought back to Edinburgh after the great day of Scotland's dolour, and now preserved in the Advocates' Library. It bears only the Keith Crest, a hart's head, repeated thrice, with the legend *Veritas vincit*—a vaunt which it was not the destiny of the gallant Keith to fulfil on that fatal 9th September 1513. The standard is the subject of Plate xlvi. in the catalogue of the Heraldic Exhibition held at Edinburgh in 1892.

(2) The Huntly standard, taken in the same battle by Sir William Molyneux from the Earl of Huntly, and displayed, until the middle of last century, in the parish church of Sefton. Grievous to relate, it has since disappeared, but a water-colour drawing of it remains at Croxteth, showing a scarlet flag, charged with a variety of emblems and heraldic figures, and with the legend *Clame tot!* which Lord Southesk interpreted 'Summon all!'

(3) The Percy standard, figured in Woodward and Boutell's *Treatise on Heraldry* (ii. 649, fig. 100) as having the red cross of St. George at the hoist; the azure lion of Louvaine on the fly, with the Percy badge —the crescent and fetterlock — and sundry other devices; while the Percy motto—*Esperance en Dieu* —is repeated four times. I have not been able to trace

this standard to its present resting-place. It is not at Alnwick or Syon: is it at Petworth, whither so many Percy pictures and relics have drifted, including the spurs (or is it the sword?) of Harry Hotspur?

This Percy standard is an ensign of melancholy, having been displayed by Henry Percy 'the unthrifty,' sixth Earl of Northumberland (1527-37), most forlorn of all figures in his long, illustrious line. While passing his minority in the household of Cardinal Wolsey, he lost his heart to lovely Anne Boleyn, and came near losing his head in consequence. For the King already had cast unclean eyes upon this matchless beauty, and the Cardinal received instructions to warn the young lord of what had been marked as royal prey.

Percy stoutly refused to give up his suit. 'I have gone soe farre,' said he, 'before soe many worthy wittnesses, that I knowe not how to discharge meselfe and my conscience.'

'Well, then,' quoth my Lord Cardinall, 'I will send for your father out of the north, and he and wee shall take such order; and in the meane season I chardge thee that thou resort no more into her company as thou wilt abye the King's indignation.'[1]

Percy's father, 'the Magnificent Earl,' hastened from the north; the lovers were separated, and the young lord was wedded forthwith to Lady Mary Talbot, daughter of the Earl of Shrewsbury. Among all the shameful records of this dismal reign, there can be found no more brutal outrage than this deed of the

[1] From Sir Roger Twisden's MS., published in Nott's *Life of Wyatt*, p. 442.

Ogre King. Percy never got over it; his married life was one continued wrangle with a jealous woman. At last, in one of their quarrels, he bade her hold her peace, for she was no wife of his, in that, having been betrothed to Anne Boleyn, any subsequent marriage was illegal. The countess was but too well pleased to hear of anything that might rid her of a husband she hated. She laid the matter before her father; and Northumberland (he had succeeded to the earldom in 1527) was summoned before the Privy Council to explain the affair.

Now King Henry had not waited until the slow process of ecclesiastical law should rid him of poor Katherine of Aragon. Decree of divorce was not pronounced till May 1533, meanwhile he had secretly married Anne Boleyn; wherefore Northumberland stood in jeopardy of his head for high treason. He had no nerve for the fruitless sacrifice, especially as Anne had broken her troth to him. He escaped the scaffold by denying his mistress upon the Holy Sacrament.

Three years later King Henry had the devilish cruelty of naming him as one of seven-and-twenty peers to try Queen Anne upon a disgraceful charge. Her uncle, the Duke of Norfolk, was president of the court, and flinched not from carrying the bloody farce to a conclusion. But Northumberland could not sit it out. When Anne rose to defend herself, he quailed before her defiant glance, and hurriedly left the court, 'compelled by sudden illness,' as the Venetian ambassador had the charity to report. Thus did this feeble earl avoid the awful ordeal of condemning to the scaffold

the only woman he ever loved. He lingered out a few miserable years. Racked by disease, robbed of all his property by a dishonourable trick of the King, and deserted by his wife, he died in June 1537, aged only five-and-thirty. Richard Layton, describing his death-bed to Secretary Cromwell, wrote: 'this iij wekes he hade no money but by borowyng, as his servauntes declarede to me.'

Nevertheless, even this ill-starred earl had his brief hour of splendour and power. As Warden of the East and Middle Marches, he managed to consign to violent death quite a considerable number of his fellow-creatures. Thus, at his first Wardenry Court, held at Alnwick in January 1528, he was able to report to Cardinal Wolsey that he had beheaded nine men and hanged five for march-treason. A little later he wrote that 'all the Scots of Tivydale that came to my hands, I put them to death saving three,' and asked instructions as to these last.

The Percy standard was no doubt displayed in a notable raid which this earl made into Scotland in December 1532, at the head of 2500 men, in reporting which he declares that 'thankes be to God we did not leave one pele, gentleman's howse or grange unburnt or undestroyed, and so reculed to England. . . . Such a roode [raid] hath not been seene in winter this two hundrede years.'

(4) Lastly, there is the famous Cavers standard, still in the possession of E. Palmer Douglas, Esq. of Cavers —that flag of sage green silk to which tradition assigns a higher antiquity than any of the others. Bishop Percy of Dromore, visiting Cavers in 1744, notes that

'the family of Douglas of Cavers, Hereditary Sheriffs of Teviotdale, have long had in their possession an old standard, which they believe to be the very pennon won from Hotspur by the Earl of Douglas, to whom their ancestor was standard-bearer in the expedition [to Otterbourne in 1388].' On the face of it, this cannot be the truth. Without questioning Froissart's word for it that Douglas did encounter Hotspur in single combat before the gates of Newcastle, that he did capture the pennon from his adversary's lance, and that it was to recover that pennon that Percy followed Douglas to Otterbourne, it is clear that this flag is not that pennon. A pennon was a small pointed or forked affair, like that on the weapon of a modern lancer, whereas the Cavers flag remains twelve feet long in its present shortened state. No knight in his senses would have gone into single or any other combat with four yards of silk hanging upon his lance! Another tradition makes the flag to be Percy's banner captured at Otterbourne; but this also is impossible, first, because it is not a knight's banner, but a standard; second, because it bears, besides a lion, the cross of St. Andrew next the hoist, and, on the fly, the Douglas heart and stars and the Douglas motto *Jamais arreyre.*

Again, a third story, which was accepted, I believe, till lately as the true version by the family of Cavers, identifies the flag as the Douglas standard carried at Otterbourne by Archibald Douglas, founder of the line of Cavers. There are at least two objections fatal to this tradition. First, the lion was no part of the bearings of the Otterbourne Earl of Douglas, and the

lion is conspicuous among the devices on this standard; second, Archibald Douglas, first of Cavers, was the *second* illegitimate son of the Earl; his father was only thirty when he fell at Otterbourne, therefore Archibald cannot have been of an age to act as standard-bearer in that battle.

It has remained for Lord Southesk to clear up the mystery of the Cavers flag, and to assign it to a date nearly seventy years later than that of Otterbourne. When the house of Douglas, already powerful, divided into two branches—the Red Douglas and the Black—by the bestowal of the earldom of Angus upon George, illegitimate son of the first Earl of Douglas, in 1397, the Red Douglas quartered his paternal coat with the lion of Angus, which remained ever after a conspicuous figure in the arms of his descendants. On the fall of the Black Douglas in 1455, his lands and power were transferred to the fourth Earl of Angus, who, being Warden of the West Marches in 1452, appointed Douglas of Cavers his keeper of Hermitage Castle. It is probable, therefore, that the lion on the Cavers flag is that of Angus, and that this was the standard displayed by the keeper of Hermitage.

Now, although we have forgotten all about heraldry, we are still great people for flags. What with our jubilees, coronations, royal progresses, and so forth, the consumption of bunting in this country during the last five-and-twenty years must have been prodigious; yet the result of it all is a trifle monotonous. When an occasion arises for throwing up of hats, we repair to the stores and lay in a stock of cheap Union Jacks.

Perhaps we vary the scheme by investing in what used to be, but no longer are, the Royal Standards of the individual realms composing the United Kingdom —ignoring the fact that the arms of England, Scotland, and Ireland have no heraldic existence except as quartered with each other, any more than the crosses of St. Andrew, St. George, and St. Patrick have any significance except as components of the national flag. The solecism is harmless; but, strictly speaking, the Union flag, and that alone, is all that every British subject is entitled to fly in his own right, unless he has arms and chooses to hoist his own banner or pennon. Now for a few guineas anybody can have his arms done upon bunting twelve feet by four; but whereas many people feel restrained by characteristic British dislike of swagger from hoisting their rightful banners, let these but reflect how greatly they would contribute to the interest and variety, not only of festive occasions, but of everyday travel through the country, were they to display when at home their proper banners, often of ancient historic association, from the flagstaffs of their mansions.

Oh but, one will say, the world is too serious and busy to fret itself about obsolete frivolities. The age has gone by when common gravity would tolerate a lady's garter being taken as the emblem of the premier order of knighthood. (By the by, if one may speak from hearsay, it appears that the garter is no longer an article of feminine attire, any more than the nightcap; and that if the most noble of British brotherhoods had chanced to be founded in the twentieth century instead

of the fourteenth, it must have been named the Order of the Suspender!) Well, it may be so, and the day may be at hand when the display of bunting in any form may be discarded as childish. All that I urge is that, so long as we *do* hoist flags, they shall mean something intelligible.

Even the grave science of botany has deigned to borrow something from heraldry. There is no more cosmopolitan plant than the common brake fern, which has made itself at home in every temperate quarter of the globe, and threatens to obliterate many less robust herbs. Take a bracken root, cut it obliquely across with a sharp knife, and the brown veins in the white pith will present you with a very fair simulacrum of a double-headed eagle. This, the emblem of the Holy Roman Empire, was claimed by its heralds as token of its rightful supremacy wherever bracken might be found. Hence Linnæus named this fern *Pteris aquilina*, the eagle fern, and the title has been confirmed by modern classifiers.

Strange as it may seem, increasing knowledge of zoology has been one cause of the decay of heraldic art. Naturalistic portraiture of animals is a snare to which herald painters and sculptors first showed a tendency towards the end of the seventeenth century. So long as neither the artist nor the general public had ever set eyes on a lion, they were quite satisfied with the attenuated creature of terrific aspect which represented that animal in early heraldry, but so soon as conventional drawing became tainted with an attempt at realism, the rampant lion became an absurdity, no

more dignified than a dancing poodle. There is no middle course in heraldic painting. If you have to represent an azure lion with scarlet tongue and claws, you only render the beast ridiculous by making it anatomically correct. Presently you will be landed in that preposterous eighteenth-century fallacy of representing landscape, pyramids, palm-trees, and what not upon the escutcheon of distinguished persons.

The precocity and scope of Japanese civilisation are trite subjects. Even in such superfluities as heraldry they have caught the true knack and spirit of abstraction. They have chosen as their national flag the rising sun: but they are far too instinct with the artistic sense to make any attempt at realism. A scarlet orb, emerging from the lower quarter of the flag, drives scarlet rays across the argent field. Nothing could much less resemble the actual planet; yet no more perfect emblem could be devised, nor could it fulfil more admirably the purpose of a distinct ensign.

There is one heraldic term which has found its way into everyday speech, but is seldom used in its proper meaning. It has come to be the practice, even of good writers, to use the verb 'to blazon' in a sense wholly different from what it bears in heraldry. The late Professor Skeat, whom few men ever caught tripping, gave two different words—(1) *blazon*, a proclamation, to proclaim, which he assigns to an Anglo-Saxon or Scandinavian source, and (2) *blazon*, to pourtray armorial bearings, from the French *blason*,

a coat of arms. He quotes Brachet's *Etymological Dictionary* to the effect that, in the eleventh century, *blason* meant a buckler or shield. It may be so, though one may venture to doubt it; but, technically, to blazon *never* means 'to pourtray armorial bearings.' To do so in colour is 'to display' or 'to limn' arms; to draw them without colour is 'to trick' them. 'To blazon,' says Guillim, 'is to express what the shapes, kinds, and colours of things born in Armes are, together with their apt significations.' Ruskin had quite lost sight of the true sense when he wrote: 'Their effect is often deeper when the lines are dim than when they are blazoned in crimson and pale gold' (*Modern Painters*). It may be said that literature has no concern with the technical meaning of words; yet it conduces to understanding that words should not be misapplied. Readers may remember the uncertainty caused by a recent historian, who, in attempting to describe Cromwell's wars, several times writes of a 'division' of infantry, when he means a battalion or company. Shakespeare, at all events, frequently uses the term blazon, and never in any sense but that of describing or proclaiming:

'*Beatrice.* The Count is neither sad, nor sick, nor merry, nor well; but civil, Count, civil as an orange, and somewhat of that jealous complexion.

'*Don Pedro.* I' faith, lady, I think your blazon to be true.'

'He hath achieved a maid,' says Cassio about Desdemona, 'one that exceeds the quirks of blazoning pens.' Here the reference is clearly to literary description,

whereas the Ghost in *Hamlet* alludes to oral communication:

> 'But that I am forbid
> To tell the secrets of my prison-house,
> I could a tale unfold, whose lightest word
> Would harrow up thy soul, freeze thy young blood.
> But this eternal blazon must not be
> To *ears* of flesh and blood.'

Modern usage may be held to sanction the use of this word to signify the illumination of arms; but Dr. Johnson knew better than so to interpret it. He cited Addison for the primary meaning of the verb being 'to explain in proper terms the figures on ensigns armorial.' However, I hear the reader yawning; all this is matter fitter for the precise disputants of *Notes and Queries* than for these irresponsible pages.

February

VI

The Roe

It is a grievous pity that it is impossible to reconcile the interests of forestry, agriculture, or horticulture with the presence of the most graceful of all British mammals—the roe (*Capreolus capreolus*). Its exceeding beauty makes one loth to decree its destruction; but when our lowland woods are invaded, as commonly happens in winter, by small companies of roe from the uplands, we have to harden our hearts and take measures offensive. If these elegant immigrants were spared, they would soon multiply to become a serious nuisance, for the doe usually bears two fawns at a birth about the beginning or middle of June. It is remarkable that in the roe the period of gestation is about forty weeks, being six or eight weeks longer than in the red hind, which only exceptionally bears more than one calf at a birth.

It is practically impossible to protect crops from the ravages of roe, and equally impossible to withhold admiration from the careless grace with which they leap any fence of ordinary dimensions. A few mornings ago (I am writing in January 1919) I happened to

be taking a stroll just before sunrise. Something had moved three doe roes which, without seeing me, came at a lively canter across the park, bounded airily over a wire-fence and wide ditch within twenty yards of me, and disappeared in the wood. Of a truth the sight caused a mere biped, clad in thick tweed and heavily shod, to feel his hopeless inferiority in grace and movement.

Mr. J. G. Millais has so vividly described how the doe, normally so nervous and timid, displays exceeding boldness in defence of her young that I crave leave to quote the passage:

'I was waiting with Ross one evening in 1891 at Kiltarlity for a buck to come out of a wood. The doe and her two calves had already appeared, and fed in front of us for nearly an hour. Up to this time the wind had been favourable; but a puff of man-tainted atmosphere must have been borne to her on some back eddy, for we witnessed a most interesting display of maternal love. Without looking in our direction or giving us to understand that she was aware of our presence, I saw her walk quietly up to the calf nearest to her and press it down over the rump with her chin. The little one dropped at once out of sight and, seeming to apprehend that there was danger, did not move again. The mother then walked slowly to her other calf which was some distance away, and tried to treat it in a similar fashion; but the little fellow was enjoying his dinner too much, and, refusing to squat, galloped away in a circle. She pursued the delinquent closely and, again and again pressing it down with both foot and chin, forced it to the ground, where she held it for a few seconds. The clever roe then ran close up to our position, cocked her ears, looked straight in our faces, and, emitting a loud bark, galloped away.'[1]

[1] *The Mammals of Great Britain and Ireland*, vol. iii. p. 172.

The roe's winter coat is dark, slaty-brown, but this changes in May to bright russet and so continues till after the rutting season, which begins in July or August. Both sexes carry at all seasons, on the rump, a large disk of pure white 'pelage' (the technical term for the fur or hair of all kinds of deer). This, being very conspicuous, often betrays the presence of a roe which might otherwise easily be overlooked in the twilight of a wood. Naturalists have long been puzzled as to the purpose of this singular feature, which, like the corresponding white scut of hares and rabbits, seems so strangely at variance with any scheme of protective colouring. No satisfactory explanation has been propounded of the anomaly. It can hardly be to the advantage of these animals to wave, as it were, a white handkerchief in the face of man or beast in pursuit of them.

The Baron of Bradwardine told Captain Waverley that 'the roe may be hunted at all times alike, for, never being in what is termed "pride of grease," he is also never out of season, though it be a truth that his venison is not equal to that of either the red or the fallow deer.' Personally, I have always endeavoured to have our immigrant roe killed between October and the end of April, when their coats are dark, and the doe should never be used for food except between August and the end of February.

In primitive times, before the forest was cleared away, roe-deer no doubt existed all over Great Britain, north and south; but there is no geological evidence of their former presence in Ireland. They have never

become wholly extinct in the Scottish Highlands; but they seem to have entirely disappeared from the Lowlands and from England and Wales. The roe which are so abundant in certain parts of Galloway are descended from some which the first Marquess of Ailsa was at pains to introduce to his woods at Culzean, in Ayrshire, early in the nineteenth century. These multiplied so exceedingly and wrought so much mischief on trees and crops that an edict was issued for their destruction. It is recorded that between six or seven hundred were shot in the first year of persecution.

Though I have killed many a red stag in my time without feeling a trace of compunction, I never shot but one roe-deer, nor could I ever bring myself to draw a bead again upon one of these beautiful animals. Even Charles St. John, who shed without ruth the blood of so many wild animals, including that angelic creature the wild swan, could not always bring himself to fire at a roe. 'I watched a roe,' says he, 'stripping the leaves of a long bramble shoot. My rifle was aimed at his heart and my finger was on the trigger; but I made some excuse or other to myself for not killing him, and I left him undisturbed. His beauty saved him.'

Nevertheless, no tender mercy intervened to hinder me from passing sentence of death upon five roe which found their way into our flower-garden last autumn. It is not what the roe eats that is most aggravating; it is the habit of the buck to choose one's choicest young conifer to rub the velvet off his horns withal. The bark is rubbed off more easily than the velvet, and the tree dies.

VII

Birds and Man

It is not easy, nay it is probably impossible, to account for the difference in the behaviour of various species of birds in the presence of Man the arch enemy. I do not mean the greater or less boldness, or, as we call it, tameness, exhibited by individuals, but the average of confidence or nervous suspicion characterising a whole species as contrasted with another species. Why, for instance, does the lapwing so frequently fly within easy gunshot and, in the nesting season, circle round and round the intruder, seeking to lead him astray from its eggs or young by frenzied screams and freak wingmanship? The curlew, on the other hand, though a very near relative of the lapwing, is most watchful against the approach of any human being, taking flight with piercing cries of alarm at the first inkling of his presence. Yet of the two species, surely the lapwing has more reason for dread of man than the curlew; for those who have tasted roast curlew (of whom I am not one) do not seem to hanker after more; nor are curlews' eggs commonly collected for food; whereas hundreds of thousands of lapwings' eggs are sent to market annually for the delectation of those who fare sumptuously every day, and, shameful to say, the parent birds are netted or shot in numbers that may be guessed at from the display of their pretty corpses in poulterers' shops in any of our great towns. Lapwings are palmed off as golden plover upon the customers of restaurants, and the feet are almost invariably removed before the birds are served at table; else it would be easy to detect the imposi-

tion, for, while both species have three front toes on each foot, the lapwing has a short hind toe also, which the golden plover has not.

Curlews and lapwings being, as aforesaid, nearly related, let us compare the behaviour of two song-birds belonging to different groups. I was brought up to regard the robin-redbreast as a member of the *Sylviidæ* or Warblers, but I understand it has now been removed to the *Turdidæ* or Thrush family, because its offspring in the nesting stage are marked with spots, which no self-respecting Warbler would tolerate in her nursery. The wren (that is, the true wren, not the gold-crest, the willow-wren, or the wood-wren, which are classed among the Warblers) is the only British representative of that furtive clan *Troglodytidæ* or Hole-haunters, unless the St. Kilda wren be recognised as a distinct species. Frequenting the same gardens, and commonly believed by children to be husband and wife, no two birds differ more widely than the robin and the wren in their behaviour towards man. The wren will never accept anything from your bounty, remaining distrustful even in the hardest weather. True, it flits closely about human habitations, well knowing what treasure of creeping things gathers under eaves and among outhouses. It will pipe to you its cheerful little lay in all weathers, but will neither offer nor allow the slightest familiarity. But the robin —well, we all know the engaging confidence with which he claims confidence with man. Go where you will—in the garden, in the fields, even on the open moor—if you put your hand to any work with spade or axe, a

redbreast is sure to appear on the scene. Alighting close before you, he cocks a confident eye as if to say: 'Look here; you must turn up something for me. I simply can't get through this winter without nourishing diet, so look sharp!' Only the other day I was fishing a salmon cast on the Spey; it was bitter March weather and I had a hard battle with the gale. I had just managed to get out a fairly good line when, presto! a robin was sitting on my rod. Goodness knows where he came from, for it was far from any homestead. The question remains—why should the wren apprehend more from human treachery than the robin?

The song-thrush becomes very tolerant of man's presence during the nesting season, hopping about on the lawn quite near him; but the gregarious thrushes —the redwing (*Turdus iliacus*) and the fieldfare (*T. pilaris*)—remain excessively wary and restless during their winter sojourn in these islands. When feeding in the fields and hedges, they always keep vedettes posted on some tree or commanding position, and on the first note of alarm, the whole flock takes wing and is away. Fieldfares are esteemed as a delicacy, I believe, in some parts of England, but I have never known them to be persecuted in Scotland. Considering with what diligence the song-thrush is shot in France, where it ranks as high-class *gibier*, it is remarkable that it has not learnt the distrust of man habitually shown by the fieldfare. Habitually, that is, during its winter sojourn with us; but in Norway, where fieldfares nest together in large colonies among the alders and birchwoods, they exhibit much less anxiety.

Among waterfowl there are different degrees of shyness. Of the species that visit our Sanctuary Lake the golden-eye (*Clangula glaucion*) is the most nervous, showing in marked contrast in that respect to the tufted duck (*Fuligula cristata*) and the pochard (*F. ferina*), two species which so commonly swim together. From a mixed flock of these diving ducks, the golden-eye will take wing at the first sight of man, while the others simply move away without showing any agitation.

VIII

Deeside in February

No lover awaits the coming of his lady-love with more keenly palpitating anxiety than that which agitates the salmon-fisher in the days immediately preceding the opening of a new season. Even greybeards, whose most grievous complaint against the calendar is the ever-increasing speed with which the seasons slip by—even greybeards, I say, are subject to the same tremors of hope, misgiving, and fear as they experienced when their chins were still smooth and the sensation of hooking a salmon had parted with none of its novelty. It was, therefore, with feelings of like intensity that I awaited the sun to rise over Deeside on 12th February 1912.

A fickle month is February. Of recent years it had been the most wintry of the year, and in 1912 the hardest frost of the season was reserved until January had become a back number. But the cold spell was brief; before the opening of the salmon-fishing February was acting fully up to its reputation of Fill-dyke,

and the only fear that haunted anglers was whether the spate would subside in time for operations on the 12th. It did so: but only just. We were faced with a very full water on that Monday morning; many familiar features in the pools were submerged, and nothing smaller than a three-inch fly was likely to be effective. Howbeit, the cardinal merit of Highland waters is that they run big, yet beautifully clear. The chief anxiety to be allayed was whether the early fish had reached our beat, or, having reached it, had run through it. In a long river like the Dee that is always a matter of speculation. In cold weather and water spring salmon, moving in great or small companies, travel very slowly from the sea; if both be warm, they swim faster, and the pools that are well stocked one day may be tenantless the next, unless replenished by a fresh run.

In the early months when the river is in flood, salmon are prone to hug the banks, avoiding the force of cold water in mid-stream. It was my lot to begin the season where the river spreads out into what is usually a broad pool with an easy current. It was now a sweeping flood, wherein, unaided by the gillie's local knowledge, a stranger like myself would have deemed it fruitless to cast a fly. To reach the lie of the fish under prevailing conditions, we had to go afloat, wading being out of the question. Confirmed sceptic as I am about the superior attraction of one fly over another, I find it impossible to divest myself of predilection; and in a big water under a gloomy sky I entertain a preference for something black. Accordingly I mounted a three-inch monster known on the

Tay as the Black Dog. A sombre, malignant-looking creature it is, bearded with long sable hackles from a heron's breast, and framed after the similitude of nothing in the heavens above, nor in the earth beneath, nor in the waters under the earth. Nevertheless, it has lured many a bold salmon to his death.

Nor did it fail me on this occasion, for I had not made a dozen casts before the line drew taut and the hook went home in *something*. In spring salmon-fishing the problem becomes urgent when one hooks a fish whether it is clean or foul? Is it a springer fresh from the salt water in all its matchless panoply of silver and pearl? Or is it a lanky kelt returning to the sea after discharging parental functions in the upper waters? Often it is not until the fish is brought close to the bank that this important question can be decided. In this instance the salmon was of the right sort, but such a small one to come out of so big a river that its captor felt a tinge of shame for his powerful rod, heavy line, treble gut, and great hook. The first salmon of the season weighed but six pounds!

Matters improved later in the day; and throughout the first week the usual average weight of spring fish in the Dee was increased by the capture of a twenty-one pounder, and several others between twelve pounds and fifteen pounds. But oh those kelts! how they strain one's back and tax one's patience. On the first day, besides four clean fish, I had to land and return to the water eleven kelts, some of them very large and lusty.

This was the first time I had ever fished the Park water on the Dee. It is a fine stretch of angling, varied enough by stream and still pool to avoid monotony, and holding plenty of fish in the early season, provided they do not run through it without resting, as they sometimes do. On arriving at Park I received the warning so often addressed to one in the early and cold months, namely, that salmon will not readily take the fly in icy water or frosty weather; and that recourse must be had to minnow, gudgeon, or eel-tail to fill the basket. Well, I must own to being prejudiced against that mode of fishing. Undoubtedly there are 'dour' days when the fish will not move to a surface bait, yet will take a sunk one readily. There are also deep places in most rivers whence salmon may be expiscated with bait, though they will never, or hardly ever, take a fly there. One such place is Neddre Fiva, a splendid stream and pool on the Rauma. I *have* taken a fish or two there with fly, but usually it is a disappointing place. I had fished it one afternoon without moving anything, when a friend came down and begged me to try it over with a gudgeon. I declined, but handed him my rod, and bade him try his luck. He took the fly-cast off my line, attached a spinning trace to it, and a quarter-of-an-hour later I gaffed a thirty-three pounder for him. Neither that nor several similar lessons served to convert me. I fish for amusement, which fly-fishing secures for me, and bait-fishing does not. Hence it comes that in the considerable section of my life that has been spent at the waterside, I have landed but two

salmon with any other lure than the fly—one of these having been hooked inadvertently when trolling for ferog in Loch Arkaig

I do not think I have suffered in consequence of this prejudice. Frequently, fishing one or other of the Highland streams in February, I have generally done quite as well with the fly as other anglers did with spinning baits and prawns. In 1896 I landed eight clean fish and innumerable kelts from the Thurso in the last week of January. On the Park water of Dee, on the aforesaid occasion, we were a party of three rods. My score for six days' fishing, whereof one was blank, was thirteen fish to the fly; exactly the same number as the combined bag of my two companions, although they used spinning baits as well as fly.

IX

Feathered Captives

Probably no statement could be made better calculated to rouse indignation in thousands of bosoms incapable of harbouring an atom of intentional cruelty than the one I am about to make, namely, that all the pastimes put together which the Humanitarian League delight in denouncing as 'blood sports' do not inflict such an aggregate of suffering upon living creatures as is inseparable from the practice of keeping birds in cages. In the term 'pastimes' the reference is only to what are recognised as legitimate British field sports, and it is not intended to include as 'cages' scientifically managed aviaries, where the diet and other requirements of the captives are well under-

LIBRARY

February on the Helmsdale

stood and ministered to. Even so, I lay myself open to the charge of being one of those who

> 'Compound for sins they are inclined to
> By damning those they have no mind to.'

Well, I must take my chance of that, admitting frankly that, while I cannot see a salmon rise in a likely bit of water without conceiving a strong desire to put a fly over him with the intention of beguiling the fish to death, I never pass a wild bird in a cage without my fingers itching to set it free. A *wild* bird—that is, a bird framed and clothed by nature for incessant activity in the free air of heaven, not one like a prize canary whose constitution and temperament have become modified through many generations reared in the close atmosphere of human habitations. Canaries know, and therefore pine for, nothing better than the life to which they were born; they have become regular domestic fowls, however sorely their dingy ancestors may have suffered in exchanging the sparkle and light of southern isles for the gloom of British parlours.

The cruelty of bird-keeping begins with the trade that replenishes the cages. For our own wild birds the legislature has put it in the power of every county council to ensure protection against capture. An order can be had from the Home Office, the Secretary for Scotland, or the Irish Office, prohibiting the taking of birds of any species which it may be considered by the local authority desirable to preserve or increase. It is to that law that we owe the welcome return of the loveliest and liveliest of our finches to districts where

it had not been seen for many years. The goldfinch, so aptly named in science *Carduelis elegans*—the pretty thistle-eater—had become one of our rare visitants, owing to its popularity as a cage bird and to its being more easily netted by decoy than most other birds. Now it is increasing in number every year. In the spring of 1912 a neighbour of mine, a well-known ornithologist, counted eighty-three goldfinches and siskins on his lawn at one time, a mixed flock of northward migrants.

The secrets of the bird trade may never be laid bare; but it is known that the rate of mortality is prodigious, both among British-caught birds and in exotic species. How should it be otherwise? Small birds are, of all living creatures, most incessantly in motion. George Montagu, prince of ornithology, managed to bring a nest containing eight young gold-crested wrens into his study without scaring away the parent birds, who continued to feed their brood. He then set himself to calculate how many trips the little mother made in the course of a summer day, bringing food to her young. He found that during sixteen hours she visited them once in every minute and a half or two minutes; that is, say, thirty-six trips every hour, or 546 between sunrise and twilight. Assuming, as one may surely do, that these trips extended to an average of one hundred yards, that gives the astonishing total of thirty-one miles. A rule-of-three sum will bring out that if a man of six feet high would emulate such a journey by undertaking one in proportion to his superiority in

stature over a bird three inches and a half long, he would have to travel 707½ miles afoot in sixteen hours, and repeat the performance on each of ten consecutive days.

I have referred elsewhere[1] at greater length to Montagu's interesting observation; I mention it again to illustrate the suffering inflicted upon small birds by confining them in narrow cages. What would be the feelings, and what the effect upon the health of a man, if he were locked up for life in a bedroom, fully dressed in outdoor clothes which he could not cast off? Some men are of sedentary habit, and might accommodate themselves more or less to such imprisonment; but constant exercise is essential to the well-being of all finches, larks, and other passerine birds. Moreover, they are subject, as man is not, to the seasonal migratory impulse, and who shall declare what pangs they undergo—what gnawing *nostalgie*—when they are prevented from obeying it?

I have before me a couple of volumes on *Cage Birds*, whereof the author (he shall be nameless, for I would avoid personalities) sets out with the postulate that 'birds, beasts, and flowers were sent for the use and joy of man.' A pretty arrogant assumption this; but suppose it granted, must it be taken as corollary that man may rightly find 'use and joy' in prohibiting to other creatures the use and joy of their special faculties? In birds these faculties are free flight and ceaseless energy, the exercise which is denied them in cages.

[1] *Memories of the Months*, third series, pp. 45, 46.

Read, for instance, how this expert prescribes for the forcible feeding of caged swallows:

'If they fail to take the meal-worms that you would place in a shallow tin or saucer, after having been caged six or seven hours, I advise you to take the bird in your left hand, open the bill by means of a toothpick, keeping the inner side of the fourth finger against the bill to keep it open, insert a piece of meal-worm or wasp-grub and release the bill to allow the bird to swallow; repeat as many times as it will take the food, then give a few spots of water by means of a quill in the same manner, put the bird back in the cage, and repeat again in a couple of hours if it still refuses to serve itself.'

It may be objected that swallows are not commonly kept in cages. That is true, because most of them die in the early days of their captivity; but the enthusiastic bird-lover delights in dealing with difficult species, just as gardeners love to conquer the reluctance of rare alpine plants to flourish on lowland rockwork. If one examines the directions for administering prison diet to these birds and compares it with the free swoop and darting flight by which swallows make their living, it is impossible to avoid the conclusion that it is nothing but an elaborate system of torment. Even if a professed expert, like the author of these volumes, succeeds in keeping alive a considerable percentage of birds submitted to unnatural conditions, much larger must be the proportion of failures, and consequent misery, inflicted by amateur effort.

A short time ago I paid a visit to a lady whom it has been my privilege to know for more years than it is altogether agreeable for either of us to contemplate.

She is very fond of cage birds, and I have never known her drawing-room without one or more. On this occasion I remarked, 'That is not the same little bird you had last time I was here.'—'Oh no,' she replied, 'that one died; they never live very long, but one can always get others.'

The remark sounds heartless; but I know well how tender is that lady's heart. She is incapable of inflicting unhappiness or pain intentionally upon any living creature. Nevertheless, the truth remains that the whole traffic in cage birds is tainted with cruelty, unintentional in the main, but none the less grievous. If educated persons have not imaginative power enabling them to realise the real nature of the penalty inflicted upon a winged creature by depriving it of freedom of flight, they are not entitled to condemn an Italian bird-catcher for depriving a nightingale of its organs of sight to stimulate its song. The motive in the first case is pastime—in the second, livelihood.

I have enjoyed within the last few hours (8th February 1913) two instances of the delight to which birds minister when left in perfect freedom. The first was in the woodland; a cock golden-pheasant was strutting in his gorgeous attire along a bank thickly covered with snowdrops in full bloom. Taking advantage of the thick foliage of a thuja, I was able to get within five yards of the bird without alarming him. It was indeed a feast of colour; the milk-white pallor of the flowers enhanced the richness of scarlet and gold, of bottle-green and brown, which compose this fine creature's everyday wear, and he

showed thus to far greater advantage than behind the wires of an aviary. Ornithologists, by the by, have been as happy in their choice of a scientific name for the gold-pheasant as they have for the goldfinch. *Thaumalea picta*, they call him—the painted wonder-bird—and we won't quarrel with them by reason of the title being half in Greek and half in Latin.[1]

Let me add that gold-pheasants are quite harmless denizens of our covers, where they breed very freely; the silver-pheasant, on the other hand, does not get on well with the common pheasants, waging fierce war upon them.

The other instance was afforded when I went down to the lake that has been a sanctuary for wild-fowl for three-quarters of a century. It had blown great guns during the night, and it was not unlikely that some strangers might have taken shelter among the woods. And so it turned out, for I had the satisfaction of watching the noblest of British water-fowl. Four whooper swans, all adults, were resting on the blue water in brilliant sunshine. As usual, the mute swans, which claim fixity of tenure here, would have no truck with the travellers, but kept themselves to themselves.

[1] Since this was written the generic name has been changed to *Chrysolophus*, meaning 'gold-crested.'

March

X

One of the problems in natural history which hitherto has baffled all attempts at solution may present itself to anybody who, strolling along the margin of a plantation on a spring evening, disturbs rabbits at their pasture. The problem is on this wise. Nature, constant in making provision for the perpetuation of every species of living creature, has bestowed upon the rabbit a very effective scheme of protective colouration, rather more grey in tone than in the tint prescribed by our War Office for the fighting dress of British troops; yet has she marred her obvious purpose by finishing off the design by a remarkably conspicuous white tail.

Why have Rabbits White Scuts?

A similar arrangement prevails among certain kinds of deer; in fact, this subject was brought to my mind of late as I passed through a wood one winter morning. My eye was arrested by what looked like a white pocket handkerchief hanging on a bush. Presently it moved, and I recognised it as the rump of a roe-deer. It was only about forty yards off, yet its dark-grey winter coat assimilated so nearly with the tree stems that I might easily have overlooked the animal, but for the white

flag so glaringly displayed. In the roe, it may be noted, the tail itself is not white. Being only about three inches long, it lies concealed in the pelage of a great white disk covering part of the upper haunches.

In the rabbit, the white fur is confined to the *lower* surface of the tail, the fur on the upper surface being blackish; so that the animal, in running away from an enemy, needs only to depress its tail in order to conceal the white part. But it never does so; even when going at full speed it carries its scut erect, as if inviting pursuit.

In his interesting and suggestive essay on *Wild Traits in Tame Animals*,[1] Mr. Louis Robinson hazards an interpretation of the puzzle which seems somewhat short of convincing. He sets out by stating the problem with perfect fairness. 'Why,' he asks, 'are many creatures which have every reason for avoiding notice, marked so conspicuously as to be visible to every eye?' He admits that deer and rabbits incur greater risks of detection and pursuit by displaying their white flags, than they would if they could keep them furled; and he accounts for their having been denied the power of doing so by the hypothesis that, these animals being gregarious, their white posteriors act as alarm signals to each other.

This theory might pass muster in default of a better if the white signal were hoisted at one time more than another; but that is not the case. Rabbits hopping about at their ease in a meadow flourish their white scuts as freely as when they bolt in dire dread of a dog

[1] Edinburgh, Blackwood and Son, 1897.

or its master, and fallow-deer and roe have no means of masking the great white disk which is their family badge. Wherefore, if white posteriors were designed as danger signals, they would constitute an incessant cry of 'Wolf!' and exact no heed. The deeper one digs into this problem the more elusive does it become.

XI

Snow had fallen pretty heavily in the night; it lay over all to a depth of two or three inches; but the early March wind that had been whirling down the strath in pitiless gusts for a week past had blown itself weary and was still. Yesterday the great pines in Orton Wood stood in massive gloom against the northern sky;[1] to-day each of them is white as a bride-cake, and the Spey rolls steely-black through a wan land. It is cold—very cold; but there are streaks of azure in the cloud canopy, and stray sunbeams light up the landscape here and there.

In Lower Strathspey

Not these the conditions which a south-country angler might deem propitious for the contemplative man's recreation; indeed, as I went forth into the keen air from a snug fireside breakfast, I was half disposed to commend Robert Burton, who, in his delectable *Anatomie*, enumerates angling among the causes of

[1] Alas for this noble woodland! it is no more. When the great war shut us off from the imports of timber, whereon we had learnt almost exclusively to rely, the Government turned in their dire need to those home woods which they had hitherto refused to consider worth attention or encouragement. One-fourth of the trees in the United Kingdom have now (1918) been laid low without regard to maturity, shelter, or seasoning; and much of what remains is doomed to follow.

melancholy, quoting Plutarch (I have not verified the reference) as denouncing 'all fishing as a filthy, base, illiberal employment, having neither wit nor perspicacity in it, nor worth the labour.' However, a long and fairly intimate acquaintance with the caprice of spring salmon teaches one to deal with them on the principle 'One never can tell.' So I stepped down the brae from my hill-crest lodging with the comforting thought that my beat for the day included the famous cast called the Hollen Bush.

The river sweeps out of the great loop of Aikenway with a tumultuous rush, as if it felt sure at last of a straight race for the sea; but the steep flank of Ben Aigan blocks the way, and once more the angry current is forced at a sharp tangent to the left. It is this sudden check that creates as near an approach to a pool that can be found in a stream which has to descend three hundred feet in ten miles, without a waterfall to ease the current. For 150 yards or so the river chafes along the foot of the cliff, and every yard of it is worth careful fishing. The sun never strikes the river here in early spring. One must wade deep to reach the lie of the fish, and under the dark surface is about as treacherous a bit of footing as may be found anywhere, for the channel is floored with junks of rock discharged from the mountain above. Not infrequently Ben Aigan fires a sniping shot at the angler at his foot.

Where the cliff is steepest—sheer into the river—a fine holly tree has found foothold near the top and gives the name to the cast. At the foot of the crag

a strong wire has been strained along the face of it as an aid to wading; and just above the wire a pair of water-ousels have built their nest, year after year, for several seasons. Now, the water-ousel or dipper is usually a most cryptic architect, choosing secret spots for domestic joys and cares—behind a waterfall, perhaps, or half-way up an inaccessible crag. But this pair have fixed on a most conspicuous site—conspicuous, at least, to one wading along the foot of a cliff; which, however, none but a salmon-fisher or otter-hunter would have occasion to do. The first day I passed this nest nothing but the mossy floor of it had been laid; to-day—17th March—the dome is complete, with a cap of snow atop of it.

But my interest in this nest is not purely ornithological. It so happened that on each of the last three days on which I fished this cast, I got a pull when standing just under the nest, hooked and landed a spring salmon. On this, my fourth visit to the Hollen Bush, nothing had moved to the fly in the upper part of the cast except a couple of kelts, which were hauled out (or rather required a lot of hauling before they could be got out, for a big kelt in this strong water often offers more effective resistance than a spring fish). In approaching the dippers' nest, then, I felt, in more than the usual degree, that tremulous anticipation which constitutes half the fascination of salmon-fishing.

Yard by yard I moved down, the big Red Ranger fly searching the cast with precision. There is the nest, right enough; the next cast will be over the exact—

Ha! In him! Bending greenheart and singing line —how often has the hooking of a salmon been described in poetic prose and prosy verse! In nine cases out of ten—nay, in ninety-nine out of a hundred —nothing out of the common happens. Either one lands the fish or loses him after a contest which seldom amounts to violence, and is generally decided one way or another in less than ten minutes.

But this turned out to be the hundredth case. From the moment he was hooked this fish never rested. He went off at a great pace down the middle of the strong stream. I put on all the strain I dared without the slightest effect. I followed as fast as a man may who is wading deep on a bottom covered with boulders; but I might as well have stood still. The line was going out at an alarming rate; more than half the backing was out; I shouted to the gillie to bring the boat that we might follow this wild chase; but before he could comply the fish turned up stream, and I recovered some line. Not for long though. Away went the salmon once more, till he had not less than 100 or 120 yards of line trailing behind him. Nothing for it now but the boat, methought, and the chance of keeping up the connection till we should arrive at the next cast—the Burnmouth. But again the fish turned, and this time appeared resolved to regain the depths of the Hollen Bush. I wound away at the reel till my arm was numb and aching. All this time I had never seen the fish. Not a glimpse of him was vouchsafed to me, but as he swam steadily up I felt confident that he was mine. It is a mighty relief, after a salmon has

made a long run, to get abreast of him again; and such relief I felt and enjoyed—but only for a moment. No sooner had I the fish well under command of the rod and was looking out for a convenient place to land him than the rod point sprang up dismally, the line slackened, the fly had lost its hold!

It was a bitter moment. That it was a heavy salmon I make no doubt; but whether it was a clean fish, or a great kelt foul-hooked, or a baggit (an unspawned, and therefore unclean, fish), I can affirm nothing. I suppose, on the whole,

> 'Tis better to have hooked and lost,
> Than never to have hooked at all.'

XII

Daffodils

One of the foibles that do most closely beset amateur gardeners, especially in the milder parts of the island, is their insatiable ambition to establish plants of doubtful hardihood—things which may pass unscathed, or partially scathed, through ordinary seasons, but succumb in one slightly more ungenial than the average. There is no more incorrigible sinner in this respect than the present writer. Lulled to a false sense of security by a series of mild seasons, he has been brought to his knees by the extraordinary caprice of the winter of 1912-13,[1] and he is now enduring full penalty in the shape of many a vacant space in the borders—many a shrivelled corpse among the shrubs.

[1] I write on the south-west coast of Scotland within a mile of the sea, which imparts much mildness to our climate; yet in the last

Why can we not content ourselves with the multitude of kindly shrubs and herbs that are perfectly able to withstand the thermal fluctuations of a British winter?

The question seems peculiarly pertinent at the moment of writing, when lawns and woodland are glorified with sheets and wreaths and scattered companies of daffodils, whereof the perfect beauty never palls, however readily readers may weary of its written praise. Shakespeare, Herrick, and Wordsworth between them have silenced all later bards by the grace and fulness with which they have praised the Lent lily.

But restless Man is never content. If *la rage du mieux* has fired him to much noble enterprise, it has also egged him into much meddlesome and mischievous interference with nature as planned by its Architect. Of all flowers of the field, none has suffered more unnecessary distortion at the hands of hybridisers and florists than the common daffodil (*Narcissus pseudo-narcissus*). Consummate itself in form and colour, peerless in the subtle harmony of golden trumpet, sulphur perianth and sea-green blades, unrivalled in profusion of bloom, and dauntless under the most evil vagaries of British springtide, it might surely have been deemed a flower to satisfy the most fastidious taste. Not so. It has been forced into unnatural alliance with its kin, and made to beget a motley horde of mongrels, wherein may be recognised the parental

week of November 1912, when shrubs and herbs were full of sap after a cold wet summer, the mercury suddenly fell to 14° F. The winter following was very mild, February especially so, encouraging premature growth, till on 18th March fresh havoc was wrought by eleven degrees of frost.

features, inflated or contracted, lengthened or shortened, more crude in colour or paler, all wanting in that air of 'race' which distinguishes the best of the wild species. Nor is that the worst that has been perpetrated. When a human infant is born with club feet, a hump-back, or some other conspicuous malformation, it is regarded as a serious misfortune both to the infant and its parents; but when somebody succeeds in raising a variety with the stamens deformed into supplementary segments of the corolla, he calls his acquaintance together and cries: 'Rejoice with me, O my friends, for I have produced a new *double* narcissus!' If the inventor is of a practical turn of mind, he bestows some preposterous name on the monstrosity, propagates it, advertises it widely and boldly, and simple folk are lured into paying prodigious prices for bulbs, until the 'novelty' is superseded in distortion by something still newer and more costly. No more cruel slight could be offered to the memory of the son of Cephissus and Līriope, from whom the whole daffodil family takes its name, than this distortion of the simple type into plethoric caricatures. To do so is a barbarous blunder of the kind that causes some savage races to file their teeth, others to flatten their heads, enlarge the lobes of their ears, or to thrust huge rings into their nostrils. One can make some allowance for gardeners of the olden time, when cultivated species were few and novelties scarce, applying themselves to raise new varieties; but there is no pretext of excuse for doing so at the present day, when the diligence of collectors in foreign

lands has so immensely increased the number of fine flowers at the disposal of the gardener, professional or amateur. We are debauched by a plethora of choice; the object should be, not to increase the confusion by creating new varieties, but to purge the list of all but the best, and produce these in the utmost perfection. One has no wish to restore roses, carnations, gladiolus, dahlias, pansies, and such like to primitive simplicity; for these have been surrendered long since to the florist's craft; but as regards the narcissus, a race which Nature has already made a masterpiece, it can but be marred by man's meddling. Well spoke Perdita of 'Nature's bastards':

> 'I'll not put
> The dibble in earth to set one slip of them.'

There is the less excuse for torturing the common daffodil forasmuch as soil, climate, and other conditions of environment have effected well-marked variety in the forms it has assumed without man meddling with it. These forms resolve themselves mainly into four, viz., *N. major* (Linn.), larger in all its parts, with the perianth segments of the same rich gold as the trumpet; *N. minor* (Linn.), much smaller in all its parts, having also the divisions and the trumpet of uniform yellow; *N. bicolor* (Linn.), a splendid flower, later in bloom, the trumpet full rich yellow, the outer segments nearly white, just a tinge of cream; and, lastly, *N. moschatus* (Linn.), with the whole flower palest primrose changing to white. Some botanists have followed Linnæus in recognising all these as distinct species; but the late Mr. J. G. Baker, who made a

special study of the subject, treated them in his *Review of the Genus Narcissus* as varieties of the common daffodil, *N. pseudo-narcissus*, and one cannot go far wrong in his guidance.

At the risk—nay, in the certainty—of being accused of inconsistency, I must pay grateful tribute to the florists who have manipulated the nonpareil (*N. incomparabilis*). Bright, graceful, and free as are the wild forms assumed by this fine species in its native Spain and southern France, I feel constrained to admit that they have been tampered with to good effect. If I were restricted to the choice of one variety in this species for garnishing a woodland glade withal or embellishing a hillside, I should ask for good store of the form sold as *N. Barri conspicuus*. New varieties are put on the market every year, but it will be long, if ever, that a more charming form than this of the nonpareil is produced.

In what degree Dutch growers are responsible for the various forms of polyanthus narcissus (*N. tazetta*) I know not. It is by nature a most variable species; nearly all the varieties thereof produce flowers of delightful beauty and perfume, and they yield them with the utmost profusion without demanding any care in cultivation.

The rage for new varieties has had the deplorable effect of throwing other species of this delectable genus into neglect. It is too true that one may visit one garden after another in April without seeing a single clump of the fragrant jonquil (*N. jonquilla*), the equally sweet campernelle (*N. odorus*), the quaint and

cheerful hoop-petticoat (*N. bulbocodium*), and the gracefully poised *N. cyclamineus*, for which we have no English name. *N. triandrus*, with reflexed sepals, is a jewel for a nook in rockwork. Strange that Linnæus should have dubbed it *triandrus*, which is a misnomer. Working, probably, from a dried specimen he counted but three stamens, whereas all the other species have six. He was deceived by the peculiar arrangement of these organs, which are set in two rows, upper and lower.

The best kinds of narcissus for naturalising in meadow or woodland are (1) the common daffodil or Lent lily and its varieties. It is probably indigenous in some of the southern English counties, and has made itself perfectly at home wherever it has been given a chance between the Land's End and Cape Wrath; (2) the nonpareil (*N. incomparabilis*) whereof the exceeding grace, methinks, puts all its illegitimate progeny in the shade; and (3) the best forms of the poet's narcissus or pheasant's eye (*N. poeticus*).

The last-named species has run into strains of varying merit; one should not be content with anything short of the best, in which the segments of the corolla are broad, flat, of firm substance, and marble white, with a shallow gold cup, rimmed with scarlet, set in their midst. Were this flower a costly orchid, it would probably be hailed as the most perfect combination of form, colour, grace, and fragrance in the whole company of herbs. We have learnt to esteem it cheaply because its generous nature and invincible hardihood have made it one of the commonest of garden flowers.

Then one must have the miniature forms of the common daffodil—be they real species or merely dwarf varieties; nor can one rule out of court the noble hybrid (if it be a hybrid and not a garden 'sport') reared many generations ago by a Lancashire weaver, John Horsfield, and called after him *Narcissus Horsfieldi*. It resembles the common daffodil in form, but is larger in all its parts, though retaining (as most of the new hybrids do not) the just proportions of the wilding. The segments of the corolla are creamy white, and the tube and crown rich gold. It has the merit of flowering a fortnight or three weeks later than the other, and can be just as easily naturalised.

One sterling virtue these hardy narcissi possess—they are absolutely immune from attack by beast or bird. Cattle avoid them in the meadow, rabbits shun them in the wood. Even cock pheasants, which have nipped off every bud of my Apennine and fulgent anemones, dug up and devoured hundreds of crocus bulbs, and wrecked my investment in rare fritillaries, dare not touch the daffodils, which carry their own defensive armament in the shape of myriads of microscopic crystals of lime contained in the sap, which would ulcerate the mouth and throat of any creature rash enough to make a meal of the flowers or foliage. Given a free soil, all the requirements of the one-flowered group of narcissus are met by deep planting—six or eight inches is not too much—and by keeping the scythe off the leaves till these have faded and fallen.

April

XIII

On 26th April 1916 I watched a thrush putting the finishing touches to her new nest, plastering the inside of it with the regulation mud. It was a pretty picture, for the bird had chosen a bush of the Himalayan *Rhododendron arboreum*, which was well set with rose-coloured trusses. I have described the building material as mud: Yarrell and most other writers on ornithology specify clay; but in this case the architect would have had to fly a long way to find anything stiff enough to be called clay, and probably she (or he) was using the ordinary light soil of the flower-borders. The plumage of the song-thrush is so much alike in male and female that it was impossible to decide whether it was the cock or the hen bird that was at work.

A Thrush's Nest.

The weather at the time was exceedingly dry, and so, consequently, was the surface of the soil. This gave rise to speculation how the bird managed to moisten the dry earth to fit it for her purpose. There was no water at hand; yet when I put my hand into the nest, the walls felt quite wet. The first egg was laid four days later—on 30th April. It seems probable that the

song-thrush is equipped for its peculiar form of nest-building with a development of the salivary glands similar to that of the swift. This provision is carried to extreme in the Chinese swifts, *Collocalia*, which build the edible nests esteemed by Chinese cooks as stock for soup. This delicacy does not commend itself to European epicures, inasmuch as the nests consist almost entirely of hardened saliva—a glutinous secretion from the salivary glands of the birds.

All birds are strictly conservative in the architecture of their nests; so much so, that one need seldom be puzzled to name the species to which an empty home belongs. But there are some differences in detail scrupulously observed by the different species of thrush for which it is not easy to find a reason. The blackbird, the ring ouzel, the mistletoe thrush, the fieldfare and the redwing[1] build on a closely similar general plan, namely, an outer case of dry grass, slender twigs, and sometimes a little moss (the mistletoe thrush is fond of adding wool), heavily plastered with mud or clay inside, and an inner lining of fine grass. The song-thrush starts on a similar plan, but stops short after the plastering process, or, at most, only adds a few fragments of rotten wood. The lining of hardened clay must be as little yielding as a plank bed, which unfeathered bipeds do not relish for repose, yet she provides nothing softer for her long incubation and for the reception of her naked brood when they are hatched. It is singular that none of the thrushes

[1] The fieldfare (*Turdus pilaris*) and the redwing (*Turdus iliacus*) have not been known to breed in Great Britain.

use feathers, so highly prized as lining material by the blue tit, the sparrow, the chaffinch, the chiffchaff, the hedge accentor, the common wren, and many other small birds. Nor do they use hair, which is in favour with the blackcap, the siskin, the skylark, and others, and they utterly neglect withered leaves, whereof the dipper weaves so warm a tapestry.

XIV

Our Gardens

More than half a century has run since Mr. William Robinson hoisted the flag of revolt against the tyranny that held mid-Victorian gardeners in thrall. Happily, he has lived to see that tyranny overthrown. It was no red revolution that he led; it was a restoration—the recall of a banished dynasty—the repeal of edicts that had swept nearly all hardy herbs into exile, and constrained the owners of every demesne, from the palace to the parsonage, from the castle terrace to the suburban fore court, to cram their borders with confectionary of crude blue, flaming scarlet, and glaring yellow. When Mr. Robinson first sounded the point of war, the drawing-room carpet and bedroom wall papers of a large country house were far more interesting subjects of contemplation than its parterres, inasmuch as some play of individual taste was allowed indoors, but the flower garden had been tilled and drilled to uniformity with those in all parts of the realm. All mystery had been expelled: no refreshing surprise awaited the visitor to a neighbour's grounds, unless by chance a few old favourites were

Garden View at Monreith

allowed on sufferance in odd corners of the kitchen garden. Elsewhere, one knew exactly what to expect on a summer day—Mrs. Pollock geranium edged with blue lobelia, yellow calceolaria bordered with purple beet, ageratum 'Lady Stair' with a selvage of grey cerastium. In winter—nothing.

One breathed—one might hear other loyal spirits breathing—sighs for the flowers that used to garland the calendar of childhood; winter aconites and hepatica, double primroses and jonquils, Madonna lilies and larkspur, bergamot and dittany, starworts and 'naked ladies.' There were plenty of rebels *in posse* against the despotism of fashion, but they had to wait for a leader combining the necessary qualities of technical knowledge of garden craft and literary aptitude. They found him at last in the person of Mr. Robinson, who, having prepared the ground by artillery, represented by the volumes on *Alpine Flowers* (1870), *The Wild Garden* (1870), and *Hardy Flowers* (1871), undertook a sustained attack with his weekly journal *The Garden*, and soon made the enemy's position untenable. A new generation has arisen, eager and understanding in flower-culture beyond any that have gone before; but very few of them recognise in Mr. Robinson the author of revival in the craft. *The Garden* newspaper has now passed into other hands; but its founder has established *Gardening Illustrated* in its place—different in title but similar in precept.[1]

No one who has not lived through it can realise the

[1] Since this was written, I regret to say *Gardening Illustrated* has changed hands, and Mr. Robinson has retired from journalism.

change wrought within half a century upon British and Irish gardens—the direct result of Mr. Robinson's crusade; with the valuable corollary that hundreds of amateurs, whose interest could be but feebly stirred by the damnable iteration of bedding-out, now find intelligent solace in cultivating an infinite variety of hardy exotics and flowering shrubs.

Still there may be recognised symptoms of the sin that doth so easily beset amateur gardeners—that of running into extremes. The first and most salutary consequence of the reaction against bedding-out was to restore the herbaceous border to its importance. Persons who have passed the meridian of life may remember the excitement of recovering forgotten favourites from kitchen borders, of chaffering with cottagers for lilies and auriculas in their plots. We did not then aim at striking effect; we were content in regaining flowers rich in association with an older world than ours—satisfied to enjoy the individual beauties of crown imperials, columbines, irises, dittany, and the like. But owing to the perverse, though unwritten, decree that herds so many country families into London during the fairest months of the year—the months of the flowers—the arrangement of the herbaceous border was of necessity committed, as a rule, to gardeners trained in the conventions of bedding-out. They attempted to treat herbaceous plants with a formality for which most of them are wholly unsuited. The surest way to mar the grace of this class of flowering herbs is so to plant them at regular intervals, repeating the same group over and over again at

measured distance. Height, of course, must be taken into account, so that the taller plants may not overgrow the lowlier; but no section of a border should present a replica of another section. This is the very antithesis of bedding-out, wherein the principle of repetition was rigidly observed.

Moreover, no arrangement can be satisfying without thoughtful adjustment of the flower border to its background. One of the commonest features in present-day gardens is a long, straight, broad border in front of a high wall, and none is less felicitous. Tall plants in such a position lose half their charm by straining forward to the light. Consider, for instance, the group of Nankeen lilies shown in the frontispiece. Their exquisite grace is untrammelled by stake or tie; whereas, had they been grown in front of a wall the stems must have been forcibly bound to the perpendicular. The ideal place for the border is on the margin of a woodland, not so close as to be in overhead shade, the space between wood and border being filled with choice shrubs to act, not as a foil, but as a setting to the floral jewellery in front. Such an arrangement admits of infinite variety. *O fortunatos nimium!* who can command water, running or still, into the picture.

In recognising trees as an essential element in a garden landscape, whether as forming a woodland background or in spacious gardens, standing here and there singly or grouped, heed is due to the manner in which flower borders may be impoverished by the inroad of far-reaching roots. It is astonishing to what a distance certain trees—the ash, the elm, and the

horse-chestnut—will range in pursuit of nourishment. It would seem almost as if they were guided by scent, or some other sense, in finding depots of nourishing soil. In my own garden I have adopted a system of control by surrounding such trees as stand near flower-beds by a narrow trench drawn at a liberal distance from the outer branches, sunk down to the hard and filled with concrete to within three inches or so of the top. The turf is then relaid over the concrete, and all that is required thereafter is to watch for any attempt on the part of the tree to send its roots over the top of the subterranean fence.

The merit of informal gardening is that each owner may follow out his own ideal. Sameness has been banished with the regulation bedding plants. For monotony, such as reigned erewhile, there is now no ghost of excuse. Abundant, superabundant variety of first-class things have been gathered for us from all the ends of the earth by enterprising nurserymen and indefatigable collectors. Every herbaceous border should provide a series of agreeable surprises to the instructed eye, while the general effect must be so ordered as to ensure pleasure to those unversed in the details of the craft. As for a recent craze in the treatment of hardy plants—the creation of 'colour schemes' and the construction of blue, red, or white borders—that is to put precious material to vulgar purpose. Those who wish to display skill in such window-dressing freaks should go back frankly to bedding-out with tender plants.

The extraordinary vogue for alpine gardening which

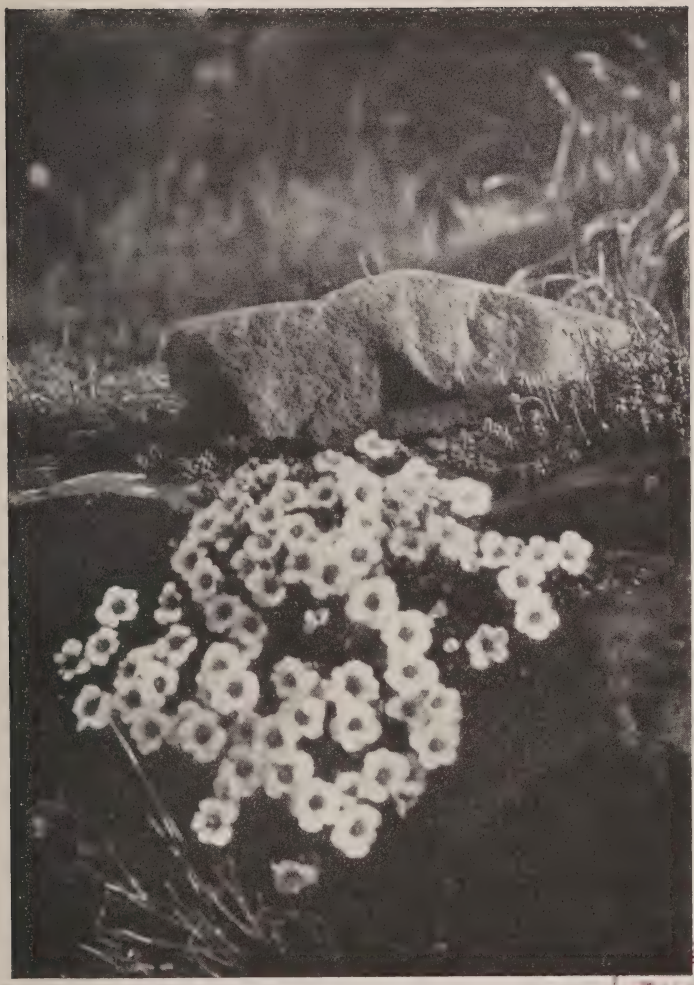
has possessed so many amateurs of late has led to many deplorable mistakes. There is, indeed, no more fascinating class of herbs than those which grow at high altitudes, and the very difficulty of reconciling them to an atmosphere more dense and enervating than their native air stimulates one's ambition to succeed with them. For great is the reward of success. A well-ordered, well-tended collection of these brilliant little mountaineers is a joy to its owner at all times of the year; for the foliage of many of them, such as the encrusted and mossy saxifrages, the whitlow grasses, house-leeks, and some species of dianthus, render them nearly as decorative in winter as their blossoms do in spring and summer. Most of the true alpines are of dwarf stature, crouching in crannies or spreading close cushions over the rocks. Moisture they must have during the season growth; but they are so impatient of stagnant wet that they refuse, at least some of them do, to survive a British winter in an ordinary flat border. Hence the need for growing them in soil raised above the level ground and supported by stones, to ensure rapid drainage; yet so entirely do some gardeners misinterpret the simple requirements of alpines that it has become a common thing to see monstrous piles erected for their accommodation, grievously out of keeping with the usual trim character of the grounds of a country house or suburban villa.

It may be said that the alpine flowers must nearly always be out of keeping with typical English park scenery. That is true; but therein is all the more reason

for not making their lodging an eyesore. It is all very well when a large tract of ground can be turned, regardless of expense, into the semblance of a mountain gorge; but there are few amateurs who command the means and can apply the cultural knowledge indispensable for the creation of such cyclopæan illusions as my lamented friend Lord Redesdale called into being at Batsford and the late Sir Frank Crisp at Friar Park. Less ambitious in design, though little inferior to these in scale, is the truly beautiful rock garden in Mr. Frederick Godman's grounds at South Lodge, near Horsham. It is not until you stand within it that you become aware of the existence of a rock garden within bowshot of the house.

At the risk of appearing invidious, I must mention one other rock garden as a conspicuous success—that which Sir John Stirling Maxwell has created round his house of Corrour. The conditions here are exceptional. The house stands 1250 above sea level, in the heart of a deer forest. No need here for artificial piling of stones; simply the ground sloping from the house to the lake has been planted with alpines, which luxuriate in natural pockets among the granite boulders so plentifully strewn upon the moorland soil. It is an alpine scene, and nowhere in the United Kingdom have I seen alpine plants seem so thoroughly at home.

The truth is that rock gardens as too commonly designed at present can never be other than eyesores in a lowland landscape. If people would only believe it, there is no position in which alpine flowers may be grown, displayed, and enjoyed better than in the joints



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Saxifraga Burseriana
Monreith, March, 1917

and crevices of a rough retaining wall. The stones should be set at a slight angle inclining inwards and downwards, so that rain may run down to the roots, which should have free access to good, not over-rich, soil behind the stones. I stood lately in an opulent demesne; acres upon acres of closely shaven lawn spread at different levels, terraced with sloping grass-banks, most troublesome to mow. The owner was keen about alpines; and here, methought, was his opportunity. He had but to strip the turf from one of these banks and replace it with retaining stones and kindly grit to provide a perfect home for mountain plants, where each could be easily and closely inspected, as herbs of this kind deserve to be, and weeds sedulously evicted, as it is imperative they should be. But no! that fatal epithet 'alpine' connotes in the popular view the necessity for mimicking the outline of an alp; whereas all the plants claim is a good root-run in free soil, shelter among stones from drought, and effective drainage. So the owner of this pleasaunce had caused a whole brae-side to be excoriated, and a mighty crane was at work, dumping huge boulders thereon to give it an alpine character.

There is another device for meeting the requirements of alpine plants—one that can be adapted to grounds of the most modest proportions. This is known as the moraine treatment, and is accomplished by excavating the soil to a depth of three feet or more, laying from six inches to a foot of good soil at the bottom, filling in to somewhat above the ground level with stone chips very sparingly mixed with loam and grit, and providing

lime rubbish for such plants as like it. The plants send their roots down through the chips and grit to the nourishing stuff below, and the coarse filling secures them alike from stagnant damp in winter and parching drought in summer. Of course, a drain must be laid to carry off water from the base of the moraine, and some experts so arrange as to have a flow passing through the bed throughout the summer, and so delude the mountain herbs into believing that the glacier is sending them its customary relief. But they do quite as well without this little fraud.

XV

The Cross-bearers

The name has here no connection with any human organisation, religious, social, or otherwise; it is used simply to designate a very numerous clan of herbs established in every part of the globe, north and south, except a few districts in the tropics. Infinite as are its varieties in colour, scent, and habit, every member of the clan bears the distinctive badge, namely, four petals set in the form of a cross, whence their scientific title of *Cruciferæ* or Cross-bearers, to be known in English as the Cress Family.

It is indeed an immense clan, ranged botanically in more than twelve hundred species, many of them of much economic importance, for among them are to be reckoned cabbage, turnip, sea-kale, radish, and so forth. One humble member of the clan was brought to my knowledge in childhood through a chance of observation of Dr. Scoresby, the Arctic explorer, who died in 1857. Picking a bit of scurvy grass (*Cochlearia*

officinalis) which trims the sea-cliffs of our west coast with a modest embroidery of fleshy, shining leaves and early white flowers, he spoke of the frenzied eagerness with which his shipmates used to pounce upon this herb, whereof the precious verdure penetrates higher latitude—nearer the North Pole—than any other Cross-bearer. Those were the days of long, slow voyages and salted provender. Tinned fresh meat and vegetables were unknown; the dread spectre of scurvy hovered in the wake of every whale-ship. At times the craving for green food became unendurable, the relief obtained from the succulent, somewhat saline, leaves of Cochlearia unspeakable.

The yellow-flowered woad (*Isatis tinctoria*) with which Cæsar records that the Britons of his day used to colour their skins, is still grown, I am told, as a crop on two or three farms in East Anglia, or was so a few years ago, for the sake of the fine blue dye extracted from the radical leaves, just as it was in the reign of Boadicea. The price used to run about £25 a ton; but first indigo and then aniline dyes knocked it down to a figure which can leave but bare profit, if any, to the cultivator. We used to grow woad in our borders, less for its ornamental quality, which is but slight, than from sentiment; but it has had to make way for more comely things, many of them contributed by the order of the Cross-bearers.

One has but to name wallflowers, stocks, rocket, candytuft, sweet madwort, arabis, honesty, and aubretia to realise what blanks would be left in the borders if the Cross-bearers were to march off. Howbeit, there

are others of the clan less familiar except to those who make hardy plants their hobby. Earliest of all, for it flowers right through mild winters, is the tiny Portuguese and North-African annual, *Ionopsidium acaule*, known in English gardens as the violet cress, and in American as the diamond flower. Why 'diamond' it would be hard to say; nor is the title 'violet' much more nearly descriptive, for the flowers are but tinged with pale lilac. It might be deemed insignificant from its diminutive stature, which attains at most to a couple of inches; but once get this little chap established by dropping seed into the chinks of a mossy wall, and you will be loth to lose it. Nor are you likely to do so, for this native of sunny Mediterranean shores sows itself as pertinaciously under our cloudy skies as its less desirable relative, the charlock or wild mustard.

Fitting companion to the violet cress, but a true perennial, is the Sardinian *Morisia hypogæa*. One would scarcely recognise this pigmy as a Cross-bearer at first sight; but closer inspection reveals the nature of a multitude of clear golden crosses, large in proportion to the plant, clustered about the centre of a rosette of narrow deeply-toothed leaves of rich ivy-green, spread flat upon the ground. If the weather is mild, it begins to flower in January, continuing all through spring, and is seldom without blossoms before midsummer. The Pyrenean whitlow-grass (*Draba pyrenaica*) is another mountain herb that closely hugs the ground. It used to be dignified as constituting a separate genus under the name of *Petrocallis*, whereof

it is a pity it should have been bereft, for it means 'beauty of the rocks,' aptly descriptive of the manner in which it spreads a grey-green tapestry over limestone. In March and April a cloud of flowers turns the tapestry into rosy-lilac.

It would take many pages to deal fairly with the Cross-bearers; I shall name but two more, which unluckily have received no English names, though they deserve the prettiest that could be invented for them. One is *Æthionema pulchellum*, a shrubby little creature growing perhaps nine inches high, with blue-green leaves and crowded spikes of flowers delectably pink in hue. The other is *Æthionema coridifolium* (sometimes appearing in trade lists as *Iberis jucunda*), shorter in stature and paler in colour than the other, but equally desirable. All these dwarf Cross-bearers respond gratefully to as much sunshine as can be had for them in the British Isles.

May

XVI

Nature's Camouflage

Life on the solid earth is a grim struggle for most animals—the stronger ever preying on the weaker. Yet for mammals, at least, the odds are perhaps in favour of each individual surviving to a respectable age (except where man interferes to upset the balance), for the majority of terrestrial mammals subsist on herbs or fruit. But it is otherwise in the world of waters. Life *on* the ocean wave is a fine affair, but beneath the waves it is one unending scene of rapine and violent death. Very few fishes are vegetarian feeders; all but an infinitesimal number are incessantly pursuing or flying for their lives. In order, therefore, that no species should be exterminated (a disaster against which Nature makes constant provision, however indifferent she may show herself to the fate of individuals), it might be expected that the food fishes which are most liable to attack from powerful enemies should have had protective colouring bestowed on them. And such we find in many species, the flounder, the sole, and flat fishes in general, not only have their upper surfaces painted in exact resemblance to the sand, ooze, or gravel whereon they may make their lair, but they are actually endowed with the property of automatically

changing their hue when they shift from dark ground to light, or *vice versa*. The cod and the ling, also, wear a livery similar both in colour and texture to the forests of kelp and tangle wherein they seek their prey. Similarly the pike, gluttonous tyrant of the river and the loch, is so cunningly dappled with olive and grey as to match exactly the water weeds wherein it makes ambush. So effective is the camouflage that one standing beside still water will probably detect a pike from its shadow on the bottom before seeing the fish itself.

But how about free-swimming fishes like the salmon, the herring, and the sprat, and, in fresh water, the grayling, the dace, and the roach? Surely if any human being in his senses wished to avoid being conspicuous he would not clothe himself from head to foot in shining armour. Yet that is precisely the raiment assigned to these and many other fishes. The sides of a fresh-run salmon and the scales of a herring gleam with the lustre of burnished silver, well calculated, one should think, to destroy all chance of concealment, for nothing catches the eye so readily as glitter. Nevertheless, it has been reserved for Dr. Francis Ward of Ipswich to prove by demonstration that this panoply of brilliant scales actually serves to mask the fish's presence. He found that when he put a roach or other silvery fish in a white basin of water and held brightly coloured strips of paper near it, the colours were clearly reflected from the fish's side. 'Not only,' says he, 'will the body of the fish show these colours, but they will appear more brilliant on it than on the strips

of paper when under water.'[1] The silvery sides of these fish act as mirrors reflecting their environment, and so tending to render them invisible or, at least, inconspicuous. But this protection only avails the fish so long as it maintains its normal posture in the water, with its sides perpendicular. Directly it attempts any antics, the light from above flashes on the burnished surface and the creature becomes conspicuous; that is the reason why anglers using a minnow or other small fish as bait, or some artificial simulacrum of the same, find it profitable to give it a most unnatural motion by causing it to spin. In all the years that I have been a fisherman (now more in number than it is at all consolatory to contemplate) it never occurred to me to speculate why baits should be made to spin. Dr. Ward has furnished the reason for it.

He has carried research on the movements and habits of fish into great detail. Having built a study or observatory with glass sides at the bottom of a dry pond, he let the water in round and over it, stocked it with fish of various kinds, and watched and photographed them from his subaqueous lair. Having observed how faithfully the silver sides of dace and roach reflected the water-weeds among which these fish were swimming, he has described this and many other phenomena in fish life in a book which ought to be in every angler's library. Dr. Ward has certainly revealed the significance of many things with which I have been familiar from boyhood without understanding their significance

[1] *Marvels of Fish Life as revealed by the Camera*, by Dr. Francis Ward, 1911, p. 24.

or taking the trouble of trying to do so. For instance, why is it of primary importance for a fish to keep on an even keel, and how does it manage to do so, even in swift and rough water?

'When one realises how very slightly a fish has to turn on its side to reveal itself, it is remarkable that we so seldom see a silvery glint as he dashes through the water. Watch trout shooting off a shallow into the pool above. It is possible you may detect the shadowy form; but more often than not the only indication is the point of the wedge-like ripple as he leaves the gravelly bed. When fish swim rapidly they do so by swishing their tails from side to side, and there certainly would be sufficient roll of the body for the silvery sides to catch the light from above, were it not for the fact that a fish when he swims fully extends his dorsal and anal fins, and these, acting like the keel of a boat, keep him in a straight course [? keep his sides perpendicular].'[1]

Reference has been made above to the automatic change of colour in certain fishes to assimilate it to their surroundings. This phenomenon was brought particularly to my notice in the following manner: Having received from Germany (many years before the war, be it said!) a quantity of yearling black bass with which I hoped to stock a lake in the park, they were placed on arrival in a pond, there to remain till such time as they might be deemed of a size to take their lives in their hands, so to speak, in water infested with pike. We gave them two years' grace and then started to net them in the pond. Unluckily, the bottom was cumbered with stumps and snags, and the net would not work properly. In the first draught we only got

[1] *Ibid.*, p. 25.

four bass, nice fish about 8 or 10 ounces each, of a dark olive hue. They were put in a tin bath painted white inside, and the net was shot again. Four more bass were taken of the same size and colour as the first lot, but on taking them to join the others in the bath they did not look like fish of the same species. During the twenty or thirty minutes that had elapsed since the first lot were put into the bath, the effect of the white lining of the bath had been to change their dark colour into pale ashen grey, strangely in contrast with the complexion of the newcomers.

Anadromous fish—that is, fish migrating seasonally from sea to river and from river to sea—are subject to still more remarkable changes of colour to harmonise with the difference in environment. Evidently a silver coat is protective in the sea. The salmon parr before setting of for the salt water doffs the motley of a brown trout, which has served it well among the dark stones and shades of its natal stream, and puts on a jacket of glittering silver, in which garb it is termed a smolt. Conversely, when he returns to the river as a grilse or spring salmon, still in the same shining attire, he will not have been long in the fresh water before the metallic lustre of his scales begins to tarnish, turning to russet and dark grey, matching the furniture of his new lodging.

In former times, before the life history of the common eel had been satisfactorily investigated, it was believed that British waters were inhabited by two distinct species, the brown eel and the silver eel. It has now been ascertained beyond any doubt that these are fish

of a single species in different stages. Eels are bred in abysmal depths of the ocean, ascend rivers and brooks in the form of elvers, and live for an indefinite number of years in the fresh water. When their ovaries mature, they have to seek the sea (whence they never return) to deposit their spawn; but before starting they undergo a change of colour; the yellow tints disappear from their flanks, the dark olive on their upper parts assumes a lighter tint, and the whole fish assumes a silvery appearance.

XVII

'It is five yere or more ago
That it was Mey, thus dremed me,
In time of love and jolite,
That all thing ginneth waxen gay
For ther is neither bushe nor hay [1]
In Mey, but it will shrouded bene
And it with new leves wrene . . .
And than become the ground so proud
That it woll have a new shroud,
And maketh so quient his robe and fayre
That it hath hewes an hundred payre
Of grasse and flours . . .
Hard is his hert that loveth nought
In Mey, whan all his mirth is wrought,
Whan he may on these braunches here
The small birds singen clere.'

Cuckoo Spit

Spring has served and shall serve as a theme for many a bard of less renown than Chaucer, but there is one little phenomenon of the season which has not yet been celebrated in verse, yet which, if *caret vates sacer*, deserves a note in dull prose

[1] *Hay*, a hedge. Our word 'hawthorn' signifies 'hedge-thorn.'

as an example of how Nature makes elaborate provision for the comfort and security of her humblest children.

After March winds and April showers have wrought their office on the land, and the silent forces which have been silently at work since the turn of the year have clothed it with fresh verdure—when the meadow grass is deep and woodland herbage has risen to half its height, there appears upon plants of many kinds the little masses of white foam which we inelegantly speak of as cuckoo spit, and bestow no more thought thereon. Few of us pay the familiar object so much attention as to inquire into its origin; yet so delicate and complex is the machinery employed in the production of this froth, that half an hour may be spent to less purpose than examining it. If the froth is brushed off, there will be disclosed within it a little yellow creature with a fat paunch, a pointed tail, and a blunt head, measuring about one-eighth of an inch in length. This is the larva of a diminutive member of the grasshopper family, destined, if it survives the risks of childhood and adolescence, to become one of those lively little brown insects known as jack-jumpers or frog-hoppers. Entomologists, with what strikes the unlearned as a defective sense of proportion, have employed a Greek compound and a Latin adjective to label this tiny creature tautologically as *Aphrophora spumaria*, which in plain English means 'the foaming foam-producer.'

The means whereby this larva produces a mass of froth fifty times or more its own bulk, and the purpose of the mass when produced, deserve attention. A lens

of moderate power will serve to reveal a sharp beak or borer projecting from the under-side of its head. With this it punctures the shoot of some plant, causing the sap to exude, some of which it swallows for its own nutriment, and allows the rest to gather round it as a bath. While thus engaged, the lower part of the creature's body—the abdomen—is kept in rapid motion up and down. The tip of the abdomen is fitted with a delicate apparatus which acts as a pair of bellows, the up-stroke drawing in air, the down-stroke expelling it into the bath of sap, the double process causing the formation of an infinite multitude of exceedingly small bubbles.

But it has been proved by experiment that bubbles formed in the pure sap exuding from the punctured plant have no more persistence than those produced in pure water. Something is wanting to cause the bubbles to endure, just as a boy must add soap to water before he can blow bubbles that will float for a few moments in the air. The larva of the jack-jumper is equal to the occasion. Within its microscopic carcase it distils a glairy, albuminous fluid far more effective than soap, which, when exuded from its entrails, mixes with the sap and gives the bubbles such consistency that they will endure exposure to frost or scorching sun without collapsing. The foam-mass therefore lasts without diminution until such time—a fortnight or so—when the larva shall have fed its fill, grown to full size, and exchanged its yellow coat for a green one. It then drops to the ground, buries itself, and becomes a pupa until it is ready to emerge as a perfect jack-jumper.

Now as to the purpose of a dwelling made of such unlikely material. It serves, primarily, for concealment, the larva being a very toothsome tit-bit for a tomtit, willow warbler, or the like. The froth is an effective bit of camouflage, for, so closely does it resemble saliva, that neither human beings nor other animals care to meddle with it. Secondly, it preserves for the delicate youngster within an even temperature, protecting it alike from excessive heat and cold; for the myriad minute air bubbles act as an excellent non-conducting envelope.

Thousands of years before Tubal Cain invented bellows or modern man had hit upon the manufacture of aerated waters, baby jack-jumpers had been equipped with apparatus fulfilling the purpose of both. The mature insect possesses rudimentary wings which are functionless, or at least of no use for flight; nevertheless, it commands power of locomotion that puts to shame the puny plodding gait of human beings. Our athletes measure their long jumps by feet and inches; but the jack-jumper by a single stroke of its powerful thighs can cover a space, without a running start, which bears the same proportion to its stature as four hundred yards does to a man's.

When flogging the Spey the other day in the teeth of a westerly gale, it occurred to me how enviable was the power of a jack-jumper. Possessed of a similar saltatory gift, I might have leapt lightly across the river and fished from the far bank with the wind comfortably at my back.

XVIII

Warm as is the welcome offered by us to American visitors to our shores and bright as are our hopes for the permanence of the *entente cordiale* to which the United States form the latest accession, it must be admitted that there are certain products of that great country for which we have no use whatever. One of these is the great larch sawfly (*Nematus Erichsoni*) which first made its presence in this country conspicuous among the fine larch woods of Cumberland in the summer of 1906, and thereafter wrought most serious havoc there and elsewhere.

The Sawfly

This pestilent insect bores into the young growth of the larch with its saw-like ovipositor, inserting its eggs under the bark. About the middle of May the caterpillars appear—little green devils with black heads—and set to work to strip the foliage. If unchecked, the fly multiplies so prodigiously that the whole woodland stands brown and sere at midsummer. Many of the trees, especially young ones, succumb to the attack in a single season, dying outright; while those that survive are so greatly debilitated as to become the prey of the deadly larch fungus *Dasyscypha*. Several landowners, despairing of resistance to such hordes of caterpillars, felled their larches over many hundreds of acres. Many devices were gravely recommended for combating the scourge, such as spraying the trees when the caterpillars are newly hatched, collecting the cocoons when they descend into the grass in June, smoke from fires kindled under the trees, and so forth.

Such remedies might prove effective when applied to specimen trees, but too childishly futile to attempt in a woodland. When in 1907 the sawfly invaded the extensive larch woods of the Manchester Corporation at Thirlmere, busy brains went to work to devise more rational means of defence.

The chief natural enemies of the larch sawfly are three in number: (1) birds which feed on caterpillars; (2) a species of ichneumon fly (*Mesoleius aulicus*), which lays its egg in the pupa or chrysalis of the sawfly; and (3) the short-tailed field-vole (*Arvicola agrestis*), which hunts out the cocoons from the soft soil under the trees and devours them.[1] This little animal, however, is so destructive to field crops and plantations, and so prone to develop from time to time into those visitations known as 'vole-plagues,' that it would be the reverse of wisdom to encourage its presence. *Non tali auxilio!* wherefore Dr. Gordon Hewitt and Dr. Hickson of Manchester University concentrated their attention on the winged enemies of the fly.

First, as to the parasitic ichneumon fly. Nothing could be done to propagate it by artificial means. It came in the track of the sawfly, and, finding its game plentiful, multiplied in proportion. The two naturalists aforesaid established beyond all doubt its efficacy as a check on the pest. Having collected a large number of cocoons, they registered in spring those from which ichneumons and sawfly emerged respectively. The result of their investigation was remarkable.

[1] There is no doubt that the common shrew (*Sorex vulgaris*) is of use also in this matter, for it is one of our few native Insectivores.

In 1908 only 5·8 per cent. of the cocoons produced ichneumons; this was nearly doubled in 1909 by a rise to 10·9 per cent., while in 1910 it turned out that no less than 62 per cent. of the cocoons had been visited by ichneumons, whereof the grubs had devoured the larvæ of the sawfly. It became apparent in this interesting experiment that the sawfly, on arriving in Great Britain, had secured a long start over its natural parasite; but the ichneumon, having overtaken the fly, made up so quickly for lost time that the balance of nature was restored in the course of three or four seasons.

Now as to the other auxiliary force, the birds. Soft-billed birds—those that are purely or chiefly insectivorous—are seldom permanently numerous in coniferous woods. It occurred to Dr. Hickson that this might be owing to the scarcity of secure nesting places among trees of that class, so he persuaded the Manchester Corporation to provide a number of nesting boxes and have them set up among the larches. How readily the birds availed themselves of this facility may be judged from the following table taken from Dr. Hickson's report for 1912:

Year.	Number of boxes set up.	Percentage of boxes occupied.
1908	60	31
1909	174	46
1910	280	57
1911	347	66
1912	341	71

'And what,' asks Dr. Hickson, 'has been the result? The result has been that in the summer of 1911, and again in

the summer of 1912, the larch plantations of the Manchester Corporation at Thirlmere have been declared practically free from sawfly pest; the trees were green and healthy all through the season, and a good growth of wood was recorded. . . . Why is it that on the slopes of Skiddaw, at Windermere, and elsewhere the pest is as bad as ever? . . . the Thirlmere estates alone, so far as our information goes, show a well-marked immunity.'

Dr. Hickson attributes this immunity mainly to the presence of great numbers of birds. He says that three species of tits, robins, and starlings made most use of the boxes. He also credits the ichneumon fly with a very large share in the good work. The lesson is well worth the attention, not only of foresters, but of gardeners and all who depend upon growing crops subject to insect visitation. Insectivorous birds are most effective police, and find themselves in board; but suitable lodging must be provided for them, else they will not remain on the ground in spring and early summer when the output of insects is at its height. It is within the power of any one who has control of even a quarter of an acre of country ground to attract birds by providing facilities for nesting. Rich will be the reward of him who becomes the host of that rare and lovely creature the pied flycatcher, which occupied 'at least one box' in the Thirlmere woods in 1912.

So much, and it *is* much, for the services of soft-billed birds—tits, tree-creepers, warblers, etc., which make their chief diet upon insects; but it would be wrong to conclude that hard-billed birds—grain and seed-eaters—bear no share in this beneficent work. The inordinate and unwise excess to which pheasant

rearing and shooting had been carried before the war, brought that fine game-bird into so much disrepute as the costly plaything of the 'idle rich' that it is hard now to get a hearing for him. The following note which I have received from Colonel T. Cowper-Essex may be accepted as testimony to the pheasant's good offices to the forester.

'When shooting over moorland containing some larch plantations a few miles from Windermere on 20th August 1911, I found the larch trees were swarming with the sawfly caterpillar to such an extent that a hatful could easily have been gathered from any one tree. In late September or early October I found the carpet of larch needles under the trees in the affected parts of these plantations had been completely turned over and searched by some large bird. I was uncertain whether to attribute this to pheasants or black-game, both of which are in these woods: but later I got evidence that it was the work of pheasants, as the agent of a neighbouring estate told me that he had had the crops of some pheasants opened, and that they were found to be full of sawfly cocoons.'

XIX

Summer Birds

Of all the voices of the countryside there is none that confirms so confidently the coming of summer as those of the cuckoo and the corn-crake. The note of the cuckoo is inseparably associated with dewy May mornings, floating clouds, and the blaze and fragrance of whin-blossom; that of the corn-crake with balmy gloaming, springing corn, and deep flowery meadows.

The cuckoo's life history would require a whole

volume to describe in detail; indeed what has been written about it already would fill many volumes, and yet some of the details remain uncertain. It is in truth a *chronique scandaleuse*—a record of shameless profligacy if judged according to human ethics. Yet are these birds not responsible for conjugal irregularity which is the consequence of circumstances beyond their own control. By a caprice of Nature, five or six male cuckoos are hatched for every female. The reverse is the rule among certain gallinaceous fowls, our own pheasants and black-game, for instance; the result being polygamy—each cock bird lording it over his own harem, and each hen bird establishing her own little household free from all interference by her lord. But the dilemma of the female cuckoo who should attempt to decide exclusively in favour of one out of half a dozen equally eligible suitors, is one that she has abandoned as impracticable. She has accepted the situation philosophically, followed the line of least resistance, shown equal favour of all, and the result is —polyandry.

There remains, however, the problem of an establishment—a household—a nursery. Any human wife will testify that one husband in a house is handful enough; it is well if, even so, harmony is perennial. But whose is the fancy so nimble as can picture the condition of a household composed of one wife and six husbands? Imagination recoils from the prospect. Wisely has Madame Cuckoo avoided the experiment. Eggs she must lay, and whereas Nature imperatively constrains every living creature to make provision for

the perpetuation of its species, these eggs must not be left to rot on the ground. Wherefore she lays eggs preposterously small in comparison with her own bulk —so small that they may be tucked conveniently into the nest of some guileless wagtail, meadow-pipit, reed-warbler, hedge-sparrow, or the like, where they are sure to receive from an alien bosom the warmth and shelter necessary for incubation. Having distributed her full number of eggs (observers differ in their estimate of the average number laid), each in a different nest, she takes no more thought for her prospective brood, but flies off to enjoy the summer, until, towards the end of July, when the supply of caterpillars begins to dwindle, she departs for the sunnier south in company with her frivolous friends. I think there are no old cuckoos to be seen after mid-August; only birds hatched in the current season.

It is natural to feel surprised that the cuckoo should lay so small an egg, the parent being three times the size of a snipe, and a snipe's egg at least six times the bulk of a cuckoo's. The reason, however, is pretty clear. A cuckoo's egg is small in order that it may be slipped in among the eggs of a bird much smaller than herself without arousing suspicion. But why, it may be asked, should the cuckoo choose birds far smaller than herself as foster parents for her young? The answer is furnished by the darkest trait in all this career of immorality. It is necessary that the nestling cuckoo should be more powerful than any of his foster brothers and sisters, so that he may be able, with back and shoulders specially adapted for this dire purpose,

to eject them one after another from the home so patiently and skilfully constructed by their true parents. Four, five, or six legitimate babes are murdered in order that one sturdy alien shall be reared.

A further feature in the cuckoo's procedure is not so easily explained; in fact, it is better to own that, at present, no satisfactory explanation has been offered. Mr. Bidwell has prepared a list of 120 species of birds in the nests whereof cuckoo eggs have been found.[1] In very many cases these eggs are coloured closely in imitation of those of the intended foster parent. The extraordinary variety of colouration is well illustrated in Plate 49 of Seebohm's *Eggs of British Birds*, where ten specimens are represented, varying from pure sky-blue, found in a redstart's nest, through different hues and marking to deep russet mottle, closely resembling some forms of the tree-pipit's egg. As it is difficult to believe that the female cuckoo has the power of painting her eggs to match those in the nests wherein she chooses to place them, it has been inferred that the foster parent is preferred whose eggs most nearly resemble those which the cuckoo has to dispose of. But this problem, obscure in all its aspects, is still a long way from elucidation.

The career of the cuckoo, then, is one long, persistent, and habitual violation of the sixth, seventh, and tenth Commandments; in spite of which we dearly love the miscreants. Moreover, cuckoos, being actively and exclusively insectivorous, are of incalculable service to all men who till the ground. A lady writes to me from

[1] *Bulletin of the British Ornithologists' Club*, March 1896.

Renfrewshire to say that one morning she counted seventeen cuckoos picking caterpillars off her gooseberry bushes. Her veracity is far above suspicion, but her arithmetic——?

If the cry of the cuckoo is monotonous, it is at least musical, whereas that of the other summer bird I have mentioned, the corncrake or landrail, is not only monotonous but harsh and grating. It is only its association with 'the sweet o' the year' that endears it to us, for, like the cuckoo, the corncrake is vocal only during the nesting season. In his beautiful work on British birds the late Lord Lilford remarked that 'to many [persons] the word corncrake simply conveys a curious sound produced on summer evenings by an unseen and mysterious creature that seems to be possessed of the power of being in different places at the same time.' It is, indeed, most seldom that one gets a glimpse of this most furtive of fowls, except when a mower, human or mechanical, lays bare its nest, or when it is flushed by partridge shooters among the turnips. All the more surprised was I, therefore, when on 4th May 1918 I saw a corncrake making its crouching run across the closely-mown lawn before my library window. The flower-garden is fenced in with rabbit netting, and this seemed to puzzle the bird which, except on its annual migration, will only take wing as a last resource. Perhaps on arriving from oversea during the night it had alighted within the enclosure, weary after its long journey, and could not find its way out afoot.

The migration of the corncrake is one of the most

astonishing phenomena in bird life. On the rare occasions when one sees this bird on the wing it seems able to do hardly more than flit feebly with drooping legs to the nearest hedge, where it drops suddenly as if in the last stage of exhaustion. Yet there is no bolder or more inveterate traveller. The corncrakes which nest and summer in the British Isles betake themselves before winter to Africa, Asia Minor, or some part of the Mediterranean region, never venturing back to our storm-swept coasts till quite the end of April or the beginning of May, when they may expect to find grass deep enough to hide in. The seasonal movements of the quail have always been closely watched by dwellers around the Mediterranean, because of their importance for food, and Pliny states that the arrival of the quails was always preceded by the corncrakes, whence the Greek name for it—*ὀρτυγομήτρα*, the quail-leader.[1]

The corncrake far outstrips the quail in its range of migration. Starting in spring from, say, Central and Northern Africa, it wings its way to all parts of temperate Europe and Asia, and even to Iceland, which last involves a flight of at least 500 miles across the stormy North Atlantic. Nor is that the limit of its powers, for corncrakes have been found in Greenland, the Eastern United States, and Bermuda. Such feats by a creature apparently so feeble and so ill-adapted for sustained flight would be deemed incredible were it not as certain as any fact in ornithology that no corncrakes remain in these lands during the winter. Lieut. F. S. Beveridge reports from the Outer Hebrides

[1] Plinii, *Nat. Hist.*, part i. book x. chap. 23.

that the corncrake 'is very ready to seek safety in flight in North Uist. It does not seem to do so in the mainland of Scotland.'[1]

Of one peculiar trait in the behaviour of the corncrake I cannot speak from personal observation, though it is well authenticated on the testimony of others. If one is caught alive and uninjured, it will feign death in the same manner as some insects, especially beetles, are well known to do, and has been reported of other birds of the Crake family. Whether this be the automatic effect of syncope caused by fear (as I think more probable) or a voluntary device to deceive the captor, remains matter for speculation.

XX

Some interesting correspondence has appeared in *Nature* of late (1919) on the belief that has been long and widely entertained that certain snakes have the faculty of fascinating or hypnotising their prey, especially birds, to facilitate capture. The snakes of Great Britain are too small in size and too elusive in habit to afford opportunity for scrutinising their methods of capture; but a little scene which I witnessed from my library window on a May morning in 1917 was of a nature that might suggest fascination exercised by a beast of prey upon a bird. A male blackbird was sitting on the open lawn before my house; a stoat was racing round and round the bird at high speed, now rolling itself into a ball, racing again, then leaping

Fascination?

[1] *The Scottish Naturalist* for January-February, 1919, p. 18.

quite two feet into the air and turning a clean somersault, anon racing again in circles. The blackbird sat motionless; I expected that at any moment the stoat would spring upon it, which it might easily have done; but nothing of the kind happened. I watched the creatures for about seven minutes, as nearly as I can judge, during which the stoat never ceased its violent gyrations and antics and the blackbird never stirred, until suddenly it got up and flew away. The stoat, apparently not caring to perform without a 'gallery,' resumed its normal gait and disappeared in the bushes.

Now, if the blackbird was 'fascinated' in the sense of an arrest of motor volition, what broke the spell? The acrobat was at the height of his antics when the bird flew away. It is fair, I think, to assume that it had been deeply interested in the performance up to a certain point, for it is not usual for a blackbird to sit motionless for seven minutes on a spring morning (I know not how long the performance had been going on before I happened to look from the window), but it does not seem that its volition had been suspended. I incline to think that the bird had become so much interested, perhaps amused, by the freakish antics of the stoat that it stayed to watch them long enough for the stoat, had it been so minded, to make a pounce.

In his great work on British mammals, Mr. J. G. Millais refers to the well-known habit of the stoat to go through extravagant antics by way of ruse in approaching rabbits or small birds; but he also cites instances in which this animal, than which none is more bloodthirsty, behaves in this queer manner without any

deadly intention, finishing up by playing with the young rabbits that formed his audience and worrying them affectionately. In the case I have just described, it does not seem that the stoat had any intention of making its breakfast on the blackbird. It had ample opportunity of doing so had it been so disposed.

XXI

The Osprey

In some respects the Wild Birds Protection Acts, passed near the end of the nineteenth century, have fulfilled the purpose of those who promoted them. The golden eagle, the kite, the great-crested grebe, and the goldfinch are among the birds which have been redeemed, if not from actual extermination, at least from something very near it. But leglislation has not availed to avert the extinction of the osprey as a British-breeding species, and despite the sedulous efforts of certain landowners in the north to protect the last of the eyries from the ruthless rapacity of professional collectors, these chivalrous birds of ravin have been deprived of the last vestige of hospitality in these islands. Their last asylum was Loch Arkaig, in Lochaber, which, thanks to the vigilant guardianship of the late and the present Cameron of Lochiel, was never without a pair of ospreys long after they had been evicted from every other breeding station in the United Kingdom.

It was in 1899 that I last saw them there, when I was fishing for trout in that beautiful loch. In that season two pairs bred there; one eyrie being on the

Chapel Isle near the east end of the loch, the other on the shore of the mainland six or seven miles to the west. I was surprised to see how insecure were the building sites chosen by both pairs. At that time the southern shore of Loch Arkaig was clothed with a noble mantle of Scots pines (alas! they have since been felled), probably the finest and most extensive stretch of natural forest remaining in Scotland. Instead of choosing one of thousands of ancient and lofty trees for their eyrie, one pair of ospreys had built their clumsy nest on a miserable, stunted pine on the outskirt of the forest, where it was not only a very conspicuous object, but invited marauders through being only about ten feet above the ground. The other pair certainly enjoyed the security of an island, but they cared not to add to it by selecting a big tree, for they had built their nest on a weakly oak or ash, I forget which.

Both these pairs safely reared their broods in that season; but now, although the ruined eyrie long remained on the island, it has been deserted for several years. The male bird, having lost his mate, revisited the island in three or four successive springs, actually undertaking some repairs on the old home before taking his departure—a faithful but bereaved widower.

The business instinct (to call it by no harsher name) of professional collectors is stimulated to such a pitch by the fancy prices given by amateurs for British-laid eggs of rare birds as to make the guardianship of their nests extremely difficult, especially when, as is the case

with ospreys, the parent birds make no attempt at concealment. It is no new thing this craze for eggs laid, and the skins of birds killed, in Britain. Eighty years ago when Charles St. John made his tour in Sutherland, he found it in full swing and wrote bitterly of the ravages of collectors who commanded a ready sale to 'people who have not the slightest knowledge of the natural history of the bird whose eggs they fancy they are buying.'[1] The Wild Birds Protection Acts have effected much towards checking the operations of egg-stealers, but it is difficult to enforce the law in wild, thinly-peopled regions.

Since I was at Loch Arkaig in 1899, both eyries have been harried by hired miscreants, and the osprey breeds no longer in the British Isles. The end came a few years ago on a wild night of snow and wind, when a certain dauntless Highlander, tempted by a liberal bribe, raided the eyrie on the Chapel Isle. The boats were all locked up, so he stripped and, plunging into the dark, icy water, swam to the island. The hen bird was sitting close among the swaying boughs; the howling of the storm prevented her taking alarm, so the naked thief was able to capture and strangle her ruthlessly before depositing the eggs in his bonnet, the only article of raiment he had retained, and he swam back to the shore with it in his teeth.

Even if effective protection could be assured for ospreys in their breeding haunts, these birds are exposed through their roving habits to constant peril from gamekeepers, whom it is almost impossible to

[1] *Tour in Sutherland* (edit. 1849), vol. i. p. 143.

persuade to spare anything in the nature of a hawk. If the fishing in one loch turns out unsatisfactory, the osprey thinks nothing of a trip to another, perhaps two or three hundred miles away, or to the sea. Hence, when game preservation was carried to a high pitch in Scotland, very few young ospreys escaped destruction; and now, what was once one of the common birds of prey in mountainous districts has become almost, if not quite, the rarest. There were several breeding stations in the Highlands when Charles St. John knew and loved them, but the work of destruction had begun before the nineteenth century had passed its middle term. That keen-sighted field-naturalist was also an ardent angler, but he never grudged the osprey a fair share of trout and grilse, and he protested warmly against its persecution.

'Why the poor osprey should be persecuted,' says he, 'I know not, as it is quite harmless, living wholly on fish, of which there is too great an abundance in this country for the most rigid preserver to grudge this picturesque bird his share.'

'Picturesque' is but a feeble epithet to apply to such a master of wingmanship. There is no more fascinating display in bird life than is presented by an osprey circling high over the dark waters of a Highland loch, when he suddenly contracts his wingspread and, falling headlong into the waves, emerges with a trout or pike in his rough talons, carrying his prey not clumsily athwart-ships, but lengthways, parallel with his own body. One knows not which to pronounce most admirable—the quickness of vision, the certainty of aim, the

valour of the plunge, or the dexterity of grip upon so slippery a victim. It is a case of hit or miss, for the osprey cannot pursue a fish under water as a cormorant does.

The month of March probably seldom passes without bringing a few ospreys, singly or paired, to the British Isles, and these would certainly reoccupy the ancestral quarters if they were but let alone. There should be no difficulty in recognising the bird, even when it is not fishing, for it is distinguished from all others of the hawk family by its white breast and head, which are in strong contrast to the very dark plumage of back, wings and tail.

June

XXII

I FEEL grateful to the Lyon King of Arms who in the sixteenth century prescribed that the branch of the clan to which I belong should bear as 'difference' a hurcheon or hedgehog in the centre of the shield, to denote maternal descent from the family of Herries.[1] Grateful, inasmuch as in the short list of British mammals there is none more interesting to the naturalist than the hedgehog, not only for its remarkable defensive armature, but because the type has persisted almost without change throughout a vast geological period, involving alteration of climate and alternation of temperature which sufficed to bring to a close gigantic races such as the Diplodoccus, Iguanodon, woolly elephant, and many others. In his monumental work on British mammals, Mr. J. G. Millais refers to an animal resembling a hedgehog whereof the jawbone and teeth were found in Eocene beds.[2] It is true that Sir Richard Owen inclined to consider these remains as showing closer affinity with the mole than with the hedgehog; but both these animals are insectivores, probably

The Hedgehog

[1] The paternal coat of Herries is argent, three hurcheons (hedgehogs), sable; a piece of canting heraldry—Herries, *quasi* hérisson.

[2] That is, beds of the period following after the Chalk.

owning common descent from a primitive marsupial ancestry. Anyhow the creature reported on by Owen lived in an age when the London clay was being formed and the climate of England was tropical. Any small mammal which existed in that world would have to pick its way among the feet of such monsters as Palæotherium and Dinoceras, not to mention such less bulky associates as tapirs and four-toed horses. Altered conditions of land and climate swept most of these mighty types from the face of the earth; but the humble insectivores underwent little change. The mole sought safety by adopting a subterranean life; the hedgehog remained above ground and developed defensive spines; both devices proved perfectly satisfactory, so that, arriving at Pliocene times, when the English crag was formed, we find remains of hedgehogs indistinguishable from those of the present day. They had as companions various kinds of pachyderms—elephants, mastodon, hippopotamus, rhinoceros, besides the formidable sabre-toothed lion and our contemporary beavers and otters.

But these mighty forms of life were doomed to extinction. The climate slowly but steadily grew colder; by the time the English crag and forest beds had been formed it had become of arctic severity, and the greater part of what is now the British Isles was cased in a mantle of ice some hundreds of feet thick. Over the whole of Northern Europe every recognisable form of life, animal and vegetable, was extinguished. Thousands of years had to pass—thousands of feet of solid rock had to be ground into glacial clay—the land had to be

ploughed into something like its present contours before it could be restocked. The hardy little hedgehog must have been among the earliest mammalian colonists, and now occupies a territory extending from the Mediterranean seaboard to the Norwegian dales; though, like Julius Agricola and Edward I., it has not yet accomplished the conquest of the Scottish Highlands. It is spreading there, however, having lately been reported as a newcomer in Argyll. In 1892 Mr. Harvie Brown wrote: 'As far as we know, the hedgehog is not as yet found in a wild state in Sutherland, although it has been introduced on several occasions.'[1] It is difficult to account for its presence in Ireland otherwise than by human agency.

At first sight one would scarcely pronounce the hedgehog to be well equipped in the struggle for life. In locomotion it can take rank only as a crawler; flight from pursuit is out of the question; the animal's only resource in the presence of danger is passive resistance. Curling itself into a ball, it offers its spiny superficies to all comers. Yet, considering how many and majestic are the forms of life which have vanished or become greatly modified with cosmical changes, the persistence of the humble hedgehog in its primitive shape from a period long—very long—anterior to the era of man, must be accepted as proof of the practical excellence of such an unpromising design. Moreover, that the race manages to hold its own in our island without any sensible diminution in numbers, is the more remarkable because of its relentless persecution

[1] *Fauna of the Moray Basin*, i. 155.

by man. Justly or unjustly, it has earned the worst of characters as an egg-stealer and chicken assassin. Some such accusation was inevitable, seeing that every creature of furtive habit and crepuscular activity stands condemned by the average gamekeeper; but it is very difficult to get at the truth. Mr. J. G. Millais has gone very systematically and sympathetically into the question, and it is disappointing to find that he cannot clear the hedgehog's reputation. 'Its food,' he sums up, 'consists chiefly of insects, slugs, and worms; but it will also eat frogs, young rats, mice, lizards, birds' eggs, and young birds.'[1] But on page 120 he quotes a writer in the *Field* as follows:

'Hedgehogs eat raw meat voraciously, and would unquestionably kill chicks in a coop. . . . The common accusation that they suck eggs is erroneous, for they cannot crack them. A rat chisels through an egg-shell with her lower incisor teeth; a hedgehog can only crunch, and the gape of his jaws will not admit an egg as large as a sparrow's. I once shut up an unhappy hedgehog for three days with no food or water except a raw egg. It made no attempt to open it. I then gave an egg to a white rat, who had certainly never seen one before in his life. He went for it in a moment, and rolled it across the room to his box, pushing it in front of him like a brewer's man trundling a barrel. . . . I think there is no question who is the egg-stealer.'

Unluckily this witness has chosen to remain anonymous, signing himself B. D., so one cannot cross-examine him.

It is a matter which would be worth deciding, as any observant person might do one way or other once

[1] *British Mammals*, i. 11.

for all. Personally, I care not whether hedgehogs eat eggs or not: if people would but apply themselves to exterminating rats, foulest of four-footed vermin, there never would be any lack of eggs for omelettes. I am incapable of any but the kindliest feelings towards the hedgehog; nor can I look upon its delicately-moulded, swart visage, its beady eyes, and tidy black hose and mittens without equal affection for the individual and respect for the race of *Erinaceus*, representing a pedigree beside which human aristocracy seems an affair of yesterday.

But I wish they would reciprocate my feelings towards them a little more frankly. Fain would I have a numerous band of them in the flower-garden as a check upon slugs and young mice; but although that garden is effectively fenced with wire-netting against rabbits, never have I succeeded in keeping hedgehogs therein for more than a few nights. It is a mystery how they escape. If they burrowed under the wire, one would see the hole. One evening a hedgehog, nearly full-grown, was brought to me. After winning, as I thought, its confidence by an offering of bread and milk (a diet of which these animals are so fond that they will take it from the hand immediately after they are captured), the animal was placed for the night in a new dog-kennel with concrete floor and iron rails, closed with sheet-iron for eighteen inches from the ground level. The door was locked; but before morning the captive had decamped, the only possible means of exit being an aperture exactly one inch and a half wide at the hinge of the iron door.

Hedgehogs can swim well, though none has been actually seen to take to the water of its own free will. I once found five half-grown ones drowned in a wayside well into which they had fallen.

It is notable that, although there are fourteen species of *Erinaceus* in Europe, Asia, and Africa, the genus has no representative either on the American continent nor in Australasia.

XXIII

White Butterflies

One consequence of the Great War has been the multiplication of allotments, intensive industry applied to the production of food plants, and the growth, among other esculents, of unprecedented quantities of cabbage. It seems a fitting time, therefore, to note the chief insect enemies of that useful vegetable. They are two in number, closely resembling each other except in size, namely, the Large White butterfly (*Pieris brassicæ*) and the Small White (*Pieris rapæ*). Everybody knows these cheerful creatures, the Small White being the more abundant, though both species are common enough in all parts of the realm; but comparatively few people have cared to give thought to the life history of these insects, or have even applied so much attention to them as to note the marks distinguishing between the sexes.

In both species the males and females have white wings with black tips to the fore-wings. In the Large White both sexes have a black mark on the front margin of the hind-wing; but the female is distin-

guished by the black tips to her fore-wings being much larger than those of her consort, and she bears in addition two circular black spots near the middle of each fore-wing. In the Small White the black tips to the fore-wings amount to little more than smudges, the male sometimes—not always—showing a small black spot, a mere dot, in the middle of the fore-wing, where his mate carries two spots.

There are two broods of both species every year, the first appearing in May or June from caterpillars which, bred in the previous summer, passed the winter as chrysalids; the second flight coming forth in August or September. It is, of course, in the caterpillar stage that these pretty insects work mischief, and the damage would be infinitely more serious were it not for birds of many kinds that prey on them. Take note of this, ye market-gardeners and fruit-growers in general. If toll be taken by small birds, as indeed it is, of your cherries and strawberries, such fruit crops only suffer when they are ripe, and that happens but once a year; whereas the caterpillars of the Large and Small Whites swarm *twice* a year in such hordes as defy hand-picking and would render it impossible to grow cabbages and their kin out of doors but for the diligence of the bird police. Even the common house-sparrow does his bit.

More insidious in attack than the birds is another enemy of the white butterflies, a small ichneumon fly, to wit *Apanteles glomeratus*. This diminutive member of a bloodthirsty race has long been known to entomologists; but, until quite recently, one scientific writer (it might be more accurate to say one writer on science)

has followed another in giving a wholly erroneous explanation of its methods of waging war. There *lies* before me—nay, to avoid misunderstanding I will express my meaning differently—I *have* before me, as I write, one of the latest books on butterflies, published in 1903, in which we are told that the little fly *Apanteles* lays her eggs in the body of the white butterfly's caterpillar, that the grubs when hatched feed on its interior 'by a wonderful instinct avoiding vital parts,' and eventually bite their way out and form cocoons on the skin of their victim.

Now, it has been told of a pupil undergoing examination that when asked to say what he knew about a lobster, his answer was, 'A lobster is a red fish that swims backwards.'—'There are only three mistakes in your answer,' observed the examiner, 'a lobster is not red, it is not a fish, and it does not swim backwards.' Even so in this fable about the ichneumon *Apanteles*. It does *not* lay eggs in the caterpillar's body, but in the eggs of the butterfly; the grubs do *not* devour the caterpillar's interior, but simply reside there sucking the juices of their host's food; lastly, they do *not* bite their way out, for they have neither jaws nor teeth, only an orifice for suction. By the time the caterpillar begins to spin in preparation for the pupa stage the little ichneumon grubs are also ready for pupation. They (for there is a whole company of them within the body of the doomed caterpillar) manage to suck a single hole in the weak skin between two segments of their involuntary host's body; the whole troop make their exit thereby and proceed to form each

its own cocoon beside the dying caterpillar, which never survives the ordeal, though it betrayed no symptoms of discomfort or illness so long as it could go on feeding.

Most country dwellers must be familiar with the ichneumon cocoons—a pile about as big as a hazel nut of bright yellow, silky objects, oval in shape, each about the size of a canary seed. It is to be feared that these little golden treasure-heaps are often destroyed by careful gardeners in the belief that they are the eggs of the butterfly or some other mischievous insect. It is a grievous mistake. The white butterfly's eggs may be found on the under-sides of cabbage leaves. They are dull yellow, set on their ends and neatly arranged in groups of fifty or more. No mercy should be shown them.

The credit of tracing out the true procedure of *Apanteles* is due to that most industrious and original naturalist, the late J. H. Fabre. In his own inimitable way he has described how he arrived at an estimate of the extent of the service rendered to economic horticulture by these diminutive flies. He reared several hundreds of the caterpillars, whereof no less than seventy-five per cent.—three out of every four—proved to be infested by the parasitic grubs, and died in the act of preparing for metamorphosis.

XXIV

I had been fishing since 5 A.M. the charming series of pool and forss through which impetuous Kvina hurtles on its way to the Flekkefjord —on the whole, I think the most varied and romantic bit of salmon water over which it has been my lot to stretch a line—and was returning about nine o'clock quite ready for breakfast at our quarters in the village of Liknæs. Oh, those shining dewy mornings in the matchless atmosphere of a Norwegian summer; how fondly and how frequently does memory dwell on them! A cup of coffee (they understand how coffee should be made in Norway), fladbrod (a poor parody of Scots oatcake) and butter in the broad grey light—then off to the allotted beat on the river, to spend precious hours before the sun shall top the mountain crest, strike the water and put a stop to the morning fishing. Then home to breakfast, siesta, books and letters till late afternoon, when the glare shall be shut off the pools by the heights on the west.

A Hunter Wasp

My homeward path lay through a wood of oak and birch by the river-side and then across a space of sandy heath. It was exceedingly hot by this time; I was tired and hungry; but something happened as I was crossing the open to make me forget both present fatigue and prospective breakfast. A hunter wasp,[1] one of a numerous race very different in habit

[1] Insects of this family of *Aculeate Hymenopterœ* are classed as *Fossores* or Diggers, from the habit of many species of excavating burrows in the ground in which to lay their eggs in food laid up for their young.

and appearance from the social wasps with which we are most familiar, was conveying a caterpillar several times her own weight and bulk[1] to a destination which I knew must be her cell. This wasp, a female *Ammophila urnaria*, was three-quarters of an inch long, exclusive of antennæ (I did not measure her, but that is the standard for ladies of her degree). She had long but extremely serviceable legs and absurdly attenuated body, the abdomen, shaped like a miniature humming-top and armed with powerful sting, being connected with the thorax or forepart of the body by a slender pedicel or stalk as long as the head and thorax put together. The translucent wings are of an ochreous tint, body and legs black, with a single bright red band round the forepart of the abdomen.

The caterpillar which *Ammophila* was carrying when we met exceeded her own length by perhaps one-fourth, and of course was of much bulkier build, yet she was making good progress, now rising on the wing with it and making a short flight, anon dragging it along the ground aided by the vigorous motion of her wings. Her mandibles were fixed in the caterpillar's throat; it lay extended at full length under her body, with its back downwards. Had its legs been uppermost, they would have greatly increased the labour of transport over the rough sand and short heather. The

[1] 'I have taken from the mandibles of the *Sandy Ammophila* a caterpillar weighing fifteen times as much as its captor. Fifteen times! an enormous figure when we consider the strength which the huntress must expend in dragging game of this kind over the countless obstacles on the road.'—*The Hunting Wasps*, by J. H. Fabre, translated by A. T. de Mattos, p. 241.

victim was quite motionless, stung into paralysis and, it is to be hoped, insensibility by its captor.

From time to time the wasp laid her burden down, not to rest, but to take circling flights as if to make sure of her bearings, and then resumed her journey. I must have followed her for about fifty yards before she came to a small bare place in the heath, differing no whit, so far as my poor faculties could detect, from scores of similar patches all around. It became evident that this was her goal. She laid the caterpillar down, ran about it with rapidly vibrating wings, flew round in a few circles, finally alighting on the bare patch. With wings still in motion she ran to a certain spot and began lifting with her mandibles some small bits of quartz to one side from what turned out to be the burrow and cell which she had dug before going a-hunting and had carefully concealed with the fragments of quartz. When the passage was clear, she ran to the caterpillar, made one more short scouting flight and then seized her prey near the head, not this time placing her body over it, but standing clear in front of it, and proceeded to back towards the burrow, dragging the caterpillar after her. She went into the burrow tail first, and presently both hunter and game were out of sight.

As this was the first chance I had ever enjoyed of seeing *Ammophila* at work, I was strongly tempted to explore the cell, wondering whether more than one caterpillar had been stored in it. But such was my admiration for the clever huntress that I could not find it in my heart to destroy her simple architecture. Moreover, I

was pretty familiar with the description given of the habits of this insect by J. H. Fabre and by Mr. and Mrs. Peckham, and I could scarcely expect to do more than confirm the observations of such patient and accomplished naturalists. They have repeatedly seen and vividly described what I have never had the good fortune to witness, namely, that *Ammophila urnaria* having to deal with large and powerful caterpillars, drives her sting into each of the twelve segments of the captive's body, thereby paralysing the nerve-ganglion situated in each segment. In this action becomes apparent the purpose of the long and slender pedicel, little more than a thread, connecting the abdomen of the wasp with its thorax. It enables her to bend her posterior part with the utmost flexibility, and so direct the sting with precision to every segment of the caterpillar, while she remains above her prey grasping its neck with her powerful mandibles.

The caterpillar is not killed. If it were so, putrefaction would speedily ensue and the flesh would be quite unsuitable food for the wasp-grub that will be hatched from the egg that the huntress will lay in the body of her game. Human ingenuity has devised cold storage for the preservation of fresh meat; but that is a clumsy and laborious expedient compared with the refined surgery of *Ammophila* and no whit more effective. The caterpillar is kept alive, but senseless under the potent anæsthetic injected with the puncture of the ganglia, and its flesh is clean and wholesome when the grub is ready to partake of it.

Having stocked the larder and deposited her egg,

the wasp, being as careful a housewife as she is an intrepid huntress, closes the burrow, neatly replacing the select bits of gravel which hide the entrance, and flies off. Whether she has other burrows to dig—other nurseries to found—I know not. The difficulty of ascertaining this baffled the industry even of the indefatigable Fabre, for no means has been devised whereby one *Ammophila* could be distinguished from another of the same species and sex; but it is highly improbable that the race could be maintained if each mother laid but a single egg, especially as the parent does not survive the winter. That is the pathetic—the tragic—part of this and many other insect histories. The creature spends her whole strength, exercises extraordinary ingenuity, and devotes her whole free life in providing for the welfare of offspring which she shall never see.

I cannot finish this brief and imperfect summary of the life history of *Ammophila* without referring to the wonderful precision with which, after flying hither and thither in search of her special prey, she finds her way back to the burrow which she probably evacuated the day, or two or three days, before. This has been so graphically described by Mr. and Mrs. Peckham that I must crave their indulgence and quote the passage. They had found *Ammophila urnaria* hunting for prey in a friend's garden in Wisconsin, U.S.A.

'We followed her easily, and as she was in full view nearly all the time we had every hope of witnessing the capture; but in this we were destined to disappointment. We had been in attendance on her for about a quarter of an

hour when, after disappearing under the thick purslane leaves for a few moments, she came out with a green caterpillar. We had missed the wonderful sight of the paralyser at work, but we had no time to bemoan our loss, for she was making off at so rapid a pace that we were well occupied in keeping up with her. She hurried along with the same motion as before, unembarrassed by the weight of her victim. Twice she dropped it and circled over it a moment before taking it up again. For sixty feet she kept to the open ground, passing between two rows of bushes, but at the end of this division of the garden she plunged, much to our dismay, into a field of standing corn. Here we had great difficulty in following her, since, far from keeping to her former orderly course, she zigzagged among the plants in the most bewildering fashion, although keeping a general course north-east. It seemed quite impossible that she should know where she was going. The corn rose to a height of six feet all round us; the ground was uniform in appearance, and to our eyes each group of corn stalks was just like every other group. Yet without pause or hesitation the little creature passed quickly along, as we might through the familiar streets of our native town.

'At last she paused and laid her burden down. Ah! the power that has led her is not blind, mechanically perfect instinct, for she has travelled a little too far. She must go back one row into the open space that she has already crossed, although not just at this point. Nothing like a nest is visible to us. The surface of the ground looks all alike, and it is with an exclamation of wonder that we see our little guide lift two pellets of earth which have served as a covering to a small opening running down into the ground.'[1]

The temptation is strong to continue the extract, but I feel that enough, perhaps too much, has been

[1] *The Instincts and Habits of Solitary Wasps*, by George W. Peckham and Elizabeth G. Peckham, Madison, U.S.A., published by the State, 1898.

cribbed already. I earnestly advise any one who is interested in entomology to obtain possession or loan of Mr. and Mrs. Peckham's illuminating monograph on the solitary wasps, a publication undertaken at the charge of the State by the Wisconsin Geological and Natural History Survey.

I must, however, draw attention to one other point in the observations of Mr. and Mrs. Peckham on the proceedings of another wasp of the same species. They watched her after she had stored her cell, filling up the burrow with loose earth and ramming it down with her head. When the hole was full she brought some grains of soil and spread them over the top of it, then seizing a small pebble in her mandibles she pounded them down with rapid strokes, 'thus making this spot as hard and firm as the surrounding surface.' This process was repeated three times, and affords, I believe, the only authenticated instance of an insect, or indeed any other of the lower animals, using a tool or instrument to effect its purpose.

XXV

British Orchids

We spent an afternoon lately on a moorland meadow picking out the best forms among myriads of spotted orchis (*Orchis maculata*), for transplanting to the garden. It is strange that the British orchids are not more commonly grown in borders, for although they cannot compete in splendour with their lordly kinsfolk from the neighbourhood of the tropics, several species bear very pretty flowers and foliage, and

their requirements are easily provided for. Moreover, unlike most plants, our wild orchids are most easily moved when in full flower, subject to the following precaution. The flowering stem proceeds from a tuber which will disappear after the plant has seeded; but beside it grows a new tuber which will send up a bloom in the following season. If care is taken not to break the fleshy roots of the new tuber, the plant sustains no check in removal.

The colour of the flowers of the spotted orchis ranges from crimson to pure white, some of the intermediate forms being beautifully pencilled or marbled with darker tints, while the leaves of some varieties are richly spotted with chocolate, others being pale green. In the marsh orchis (*O. latifolia*) I have only come across one variation from full red purple (dangerously near magenta). The flowers of this variety are intermediate in hue between flesh colour and *vieux rose*.

A moorland meadow, such as we were in the other day, is a charming sight in June, thickly set with the spotted and marsh orchids, with here and there a colony of the butterfly orchis (*Habenaria bifolia*) with deliciously fragrant flowers which it would be scant justice to call greenish white, though they are not of snowdrop purity. The white is not clear, but is redeemed from impurity by its waxy texture. Among the legions of spotted orchis which enrich this meadow one comes from time to time upon specimens of commanding stature and showy flower-spikes. These are believed to be natural hybrids between the spotted and the marsh orchis, and make splendid garden plants in

a cool, rather moist border exposed to the sun, increasing into large clumps. One of these hybrids is supplied by some nurserymen under the name of the Kilmarnock orchis. The longer one has it, the more highly one learns to esteem it.

Habenaria conopsea, a less showy species with crimson flowers and sweet scent, prefers drier ground than those mentioned above; and so does the bright rose (*Orchis pyramidalis*), for the welfare of which lime or chalk must be provided.

But the queen of British orchids is Our Lady's Slipper (*Cypripedium calceolus*), often miscalled Ladies' Slipper, whereby the pious fancy of our pre-Reformation forebears is obscured. Never did I invest capital to better account than when, some thirty years ago, I bought the whole stock of this orchid from one who was leaving his home in Surrey and had a score of fine clumps to dispose of. They have flourished ever since in a border well treated with lime, an ingredient which this fine plant imperatively demands. Every succeeding month of May they send up through their ample foliage sheaves of stems 18 inches high, some carrying a brace, others only one, of the great flowers. A couple of these stand before me as I write. A blossom carefully measured proves to be $4\frac{3}{4}$ inches from tip to tip of the twisted side-petals. Persons seeing it for the first time will scarcely believe that it is a British wild-flower, so outlandish is the effect of the spreading petals of deep maroon set round the inflated 'slipper' of lemon yellow.

British—but is it so any more? Mr. Reginald Farrer

tells the story of a most worthy Yorkshire vicar who, having marked a spot in Arncliffe where a single clump of this precious plant lingered, used to shear off the flower-buds every spring before they opened, hoping that thereby the treasure might elude the scrutiny of the rapacious collector. And so it did for many years until one spring its guardian was laid low by illness. The orchid put forth its flowers; a fatal advertisement; for when the vicar recovered his health and went to visit his treasure-plant, he found a gaping hole whence it had been uprooted. I feared this might be the last of it; but a ray of hope is conveyed in a letter from a good friend of British wild-flowers (though he is a nurseryman!) in the north of England, who assures me that Our Lady's Slipper still survives near —— thumbscrews shall not constrain me to reveal the name! He says it is growing among lily-of-the-valley, whereof the leaves are near enough in shape and size to act as a screen to the orchid.

It is wonderful how these and other territorial orchids manage to propagate themselves, for their seeds are exceedingly minute, and the herbage in which the plants grow is usually very dense. Howbeit, they make up in the multitude of their seeds for the insignificant size thereof. Darwin found that a single spike of the early purple orchis (*O. mascula*) produced 186,000 seeds, and calculated that if they all germinated and their offspring likewise, the great-grandchildren of the original plant would suffice to cover the entire surface of the earth!

XXVI

Lilies

Of all the plants grown in British borders there is none, to my mind at least, so fascinating as lilies, and there is none in which so much disappointment awaits the amateur—no genus whereon so much money has been squandered in vain. The fact is that it is only under protest that lilies, with the exception of very few species, consent to display their full charms in our patchwork climate. Most of them demand to be kept reasonably dry during their winter sleep and to breathe in summer an atmosphere clarified by powerful and prolonged sunshine. Such conditions are not in the programme of our sea-girt lowlands. Those lilies which do flourish, more or less, with us live in chronic conflict with the asperities of British climate. And, as if that were not enough to ensure for them considerate treatment at our hands, the bulbs imported from distant lands, as are the great majority of those offered in nurserymen's catalogues, arrive in such a state of impaired vitality as to render them least able to resist disease or decay. The rootlets, slender in some species, thick and fleshy in others, either have been deliberately shorn off by the packers (as is invariably done to bulbs exported from Japan), or have dried up and become functionless in transit. Bulbs purchased in this enfeebled condition are often planted in open borders where they are expected to survive the drenching of a British winter, or they are bought at the spring sales and potted up or planted out for summer display. Such treatment of dormant

bulbs courts disaster. Of those planted out in autumn, many never show above ground. Those that survive generally throw up flowering stems from material garnered under a foreign sun; but in nine cases out of ten it is their swan song. The basal roots, as distinguished from the surface roots which are thrown out for nourishment of the flower-stem only, having been destroyed, the bulb is deprived of the only channel of nutriment for itself, and, having exhausted the store laid up in its native soil, expires of starvation.

No species suffers more grievously from maltreatment than the golden-rayed lily (*Lilium auratum*). It created an immense sensation when it was first brought to this country about sixty years ago; since which, until the year before the war inclusive, tens of thousands of bulbs have been imported annually from Japan. If only ten per cent. of these had survived transport, every garden worthy of the name in the land would be illumined with the autumnal glory of this splendid flower. As matters stand, it is most seldom that one comes across a group of this lily permanently established in the open. The effect is so magnificent when it does come off that it is worth any amount of pains to secure it.

The only chance of prolonging the lives of imported bulbs is to treat them as invalids, keeping them in hospital for six months or longer after arrival. Each bulb should be placed in a six or eight-inch pot (in the case of *L. auratum*, without lime in the compost) and kept in a cold frame till the pot is full of basal roots. Japanese bulbs are too often infested with mites or

weevils, I know not which, probably both, or with the deadly fungus *Rhizopus necans*, to destroy which the bulbs should be dipped in a one-per-cent. solution of salicylic acid and dusted with sulphur before planting. Some charcoal or wood ashes should be laid over the drainage of the pot. Bulbs thus treated in autumn will probably send up shoots more or less vigorous in the following April. If it is then found that the pot is full of fresh basal roots, the lily may be carefully planted out where it is intended it shall be permanent. But the safer course is to keep it in the pot till another season, nipping off the flower-buds and so diverting the whole stream of nutriment to the bulb. *Ars longa, vita brevis:* the sacrifice of a year's blossom may seem cruel, but it will not be made in vain.

Now I am not going to launch into a disquisition on the different requirements of various kinds of lily (and they do differ greatly in their needs). Were I to do so, in this first place, I should simply be cribbing the precepts of my friend, Mr. A. Grove, who first redeemed me from the deep despondency into which season after season of failure had plunged me, and who has placed the fruits of his unrivalled experience in this kittle genus at the disposal of amateurs in a pretty volume, whereof the purchase and perusal should precede any enterprise in lily culture.[1] Save a few scraps of independent observation gathered since Mr. Grove started me on the right path, all that I know about lilies I owe to him, and it is to his book that I refer my readers. All that I shall do here is to say which

[1] *Lilies*, by A. Grove. (Present Day Gardening Series, 1s. 6d.)

of the known species of lily, eighty or so in number, I would grow, if the choice were limited to half a dozen kinds.

Of course I should begin, as every one else would who has a smattering acquaintance with the genus, with the Madonna lily (*L. candidum*), were it not for the fell parasite that attacks, defiles, and destroys it in nine gardens out of ten, my own included. There are lilies more gorgeous in colour and more ample in size, but none to equal the Madonna in purity and grace or excel her in fragrance. When well grown she stands as the type and the *ne plus ultra* of her clan, the peerless Lily Queen. But woe is me! until some seely wight devises protection or preventive against the attacks of the fungus *Botrytis cinerea*, which began its ravages in this country, I believe within the memory of persons still living, one may not place one's trust in the Madonna, which is all the more bitter grief because, where this lily escapes the fungus, none is more easily cultivated; its requirements are of the simplest.

So, failing the Madonna, I begin my half-dozen with the Nankin lily (*L. testaceum*), whereof she is reputed to be the parent through a flirtation with the scarlet turncap (*L. chalcedonicum*). This lovely hybrid retains much of its mother's grace, as may be seen in the group which was photographed for me in the Oxford Botanic Garden (see frontispiece); while the fiery complexion of the other parent has been toned down to roseate apricot, greatly enhanced in quality by the waxy texture of the corolla and the rich ruddy orange of the anthers.[1]

[1] See page 313.

The Nankin lily does not flower till July; it was owing to the adoration I bear towards her mother that I gave her precedence over the Caucasian belle (*L. monadelphum*) which begins early in June, disputing with the Pyrenean turk's cap (*L. Pyrenaicum*) the honour of opening the lily season. *L. monadelphum* (would that some ingenious person would devise an English name for it!) is among the hardiest of its clan and the easiest to cultivate. Only one precaution is necessary, namely, to provide it with lime in the soil, which, of course, should be well drained. It will flourish and flower without lime for several seasons; but our experience is that, without that condiment, the clumps are apt to dwindle and ultimately to disappear.

The panther lily (*L. pardalinum*) stands next in my *élite*, and among the many varieties of this most generous lily methinks the finest is *Californicum*, which rears its chime of crimson and gold bells to a height of six or seven feet. Unlike the two species above named, this one detests lime as heartily as they relish it. Peat and loam are its delight. In hot districts and dry soils it requires something approaching to bog; but in the north it does quite satisfactorily in ordinary borders. The finest display of this lily I have seen is in Lady Dartmouth's bog-garden at Patshull, in Staffordshire. A wonderful conflagration takes place there in July, when hundreds of spires are alight over a wide space of ground.

In naming the martagon lily (*L. martagon*) next I claim licence to include as a variety thereof the swart *Dalmaticum*, albeit there is good ground for

the judgment of certain high authorities who recognise in it a distinct species. But whereas in the Kew Hand List it still figures as a variety, I give myself the benefit of the doubt. The type only wants to be purged of dinginess in its purple to be a fine thing; but the white variety at its best is a dream of beauty, and we have succeeded here in raising it true from seed less about 25 per cent. of broken shades, some of which are quite desirable. The Dalmatian variety, with turn-caps of intense maroon, almost black, forms a striking contrast to the white martagon; but unluckily it generally flowers a fortnight later.

Now ruffle drums and flourish trumpets, for July shall not have fully sped before the Royal Lily (*L. regale*) shall unveil her charms. How shall I celebrate them worthily, unless by taking a slight liberty with poor threadbare Horace?

'Micat inter omnes
Lilium princeps, velut inter ignes
Luna minores.'

You have allowed me to name six favourites: had you bound me down to one, this should have been my choice. Nay, had I but a single square yard of ground to cultivate, the Royal Lily should have it all to herself. Nor would you think me crazy had you seen her in splendour last summer—stems all but six feet high, slender but firm as whalebone, set with curving linear leaves and culminating in a coronal of trumpets, purple without, marble-white within, with a clear wash of gold in the throat. This paragon of lilies is of faultless constitution, demanding only good deep loam, plenty

of lime, full exposure to sunshine, and to be left alone. Moreover, it ripens plenty of seed, and the seedlings flower—a few at two and most at three years old.

That the tiger lily (*L. tigrinum*) is common, cheap, and easily grown detracts from it as a treasure of highest order only in the eyes of those whose opinion is not worth consulting, namely, those who esteem a flower chiefly for its rarity and because their neighbours do not or cannot grow it. If the tiger lily were as scarce and difficult, say, as Leichtlin's lily, what pæans would be chanted in its praise! It is indeed a glorious plant, and it is only familiarity that tends to cool our admiration. There are two varieties from the type, and both are superior to it, but it is hard to say which is the finer—*L. t. splendeus*, with very dark, shining stem, and *L. t. Fortunei*, with whitish wool on the stems. As for the double-flowered monstrosity, if the only bulb thereof in the world lay in my path, I'd set my heel on it. Unluckily, it is plentiful in the trade. The tiger lily dislikes lime and stipulates for rapid drainage.

Here am I at the end of my half-dozen, and lo! I have forgotten to put in a scarlet lily. I must stretch a point and squeeze in a seventh, for scarlet, mark you, is a hue greatly to be prized in British gardens, inasmuch as it is displayed by no native British flower. Corn poppies and scarlet pimpernel? Yes, but are not they alien weeds of cultivation, brought hither with agricultural seeds and now furnished with letters of naturalisation. That may or may not be; anyhow, a

scarlet lily we must have, and it shall be the lime-loving *L. pomponium*, the true scarlet turk's cap, not the scarlet variety of Pyrenean lily, with which it is apt to be confused. Unluckily, it is not so easy to obtain as could be desired, for although it has been grown in England for three hundred years, and although its home is not very remote from our shores, being in the Maritime Alps, yet the supply is uncertain. It is well worth an effort to possess the genuine article.

After all, have I not left out of the list that which I began with, *Lilium auratum*? I cannot consent to forgo it; it is too marvellous a flower to deny oneself. True, it does not adapt itself to our climate as readily as *L. regale* does, but treated during convalescence after the sea voyage in the manner I have described, a considerable percentage of the bulbs ought to take on and become permanent residents, especially the robust variety *macranthum*, usually named *platyphyllum* in bulb catalogues. Travellers affirm that the Japanese eat the bulbs of this noble plant even as we do the potato. Nero's *entrée* of nightingale's tongues was not a more heinous abuse. Unfortunately, mice, wireworms, and the subterranean grubs of certain moths have discovered the merits of this exotic delicacy, and from time to time one loses a clump of the golden-rayed lily which seemed to have come to stay. Nevertheless, some do stay to illumine the September border year after year with extravagant splendour.

Let me finish this prose with a word of counsel to gardeners and amateurs—the fruit of bitter experience.

If any lily, no matter what species, is thriving well and happily in any part of your garden—let it alone; for to lilies more than to any other family does the ancient shrewdly apply—

'Μή κίνει Καμαρίνην ἀκίνητος γάρ ἄμεινον.'
(Stir not Camarina ; better leave it at rest.)

July

XXVII

Char

As I sat one brilliant summer day in the cool dining-saloon of a Norwegian hotel discussing an excellent *middagsmad*, an English clergyman beside me—a stranger—passed high encomium upon the quality of a dish of trout that was handed over.

'Very good indeed,' I replied, 'but you will excuse me if I observe that they are not trout.'

My neighbour seemed to take me for a very ignorant person, probably a Cockney tourist; for he insisted with some warmth that I was mistaken, and that he knew trout well enough when he saw them. Whereupon, perhaps over-officiously, I took the head of one of these fish and drew his attention to the vomer or palatal bone, which was armed with teeth only on the forepart, proving it to be the head of a char; whereas trout and salmon carry teeth upon the entire length of the vomer. It is true that this, although a constant distinction, is not a very convincing one, inasmuch as the vomerine teeth of salmon and trout tend to drop out with advancing age, leaving only those on the front of the bone; but it has caused modern ichthyologists to recognise char as a distinct subgenus (*Salvelinus*) of the genus *Salmo*; and it is convenient

for everyday use, being the only structural difference between trout and char—two races of fish which have widely and permanently diverged in their descent from a common ancestor.

Besides this anatomical difference, there is the superficial one of colour; for although the colour scheme of trout and char have much in common, the char proclaims the approach of the spawning season by a brilliant flush overspreading its underparts, varying in different lakes from brick red to flaming vermilion; whereas trout, whether brook trout or salmon trout, lose all their summer brilliancy as the autumn advances, and become shabby in the extreme—unpleasantly slimy to handle, stained an inky hue and blotched unbecomingly with brown.

To naturalists the chars are a very interesting subject of study, because of the peculiar distribution of these salmonoids in the northern hemisphere. The most powerful of the race is the hucho (*Salvelinus hucho*, Günther) of the Danube, rival in dimensions of the Atlantic salmon, and said to be a fine sporting fish. Some years ago Lord Desborough reared a number of this species, and turned them into the upper waters of the Thames. Thus far 'the result is negative,' which was the report of a distinguished German helmintholo-gist, who, in the course of research into the life history of internal parasites, having secured from the intestines of a dog the larva of a rare species of tape-worm, swallowed it in order to test whether human beings could harbour and suffer from this particular cestode. If the powerful hucho ever become established in the

Thames, anglers for the homely chub and languid roach are likely to be in for some lively passages.

The beautiful brook trout of North America (*Salvelinus fontinalis*) is another true char, and bright were the hopes of British trout-fishers when it was introduced to this country in the last quarter of the nineteenth century. It was reared in hatcheries by hundreds of thousands, and distributed so widely that probably there is not a county in Great Britain where some attempt has not been made to establish so desirable a species. But all has proved in vain. The young fish grow bravely for a year, or perhaps two years, after being liberated. The lovely dark marbling on the olive-green back and sides and the vermilion flush overspreading the belly and flanks towards the end of summer, combined with the faultless symmetry of the shapely body and small head, make our native brook trout seem almost shabby in comparison with the foreigners. But these dainty aliens have refused all offers of naturalisation. They invariably disappear in a mysterious manner in the second or third year after being turned loose.

Of the European char, Scandinavian ichthyologists, who are far from prone to admit multiplicity of species, recognise two kinds as distinct—the northern char (*S. alpinus*) and the Sælbling (*S. umbla*).[1] No doubt those two diverged from a common ancestry, but the northern char differs from all others in its migratory habit, living part of the year as a raider in the sea, clothed in the silver

[1] *History of Scandinavian Fishes*, by Messrs. Fries, Ekström, and Sundevall, vol. ii. p. 835. (English translation, 1895.)

livery of the true salmon, and donning a scarlet raiment before ascending the rivers to spawn. I have no experience of this fine creature, never having fished in rivers north of Trondjhem, and it only is found in sub-Arctic waters; but Mr. Abel Chapman has given a very attractive description of its sporting qualities in his *Wild Norway*, and Günther writes of specimens attaining a length of four feet. This, however, is in excess of any authentic record which I have found, though in Lake Wetter it has been taken 2½ feet long and weighing 17 lb.,[1] the average weight being about 4 lb. These fish betoken their hereditary association with Arctic conditions by shunning the powerful sun of a Scandinavian summer, for they remain in water twenty or thirty fathoms deep until the coolness of the declining year summons them to shallower banks to deposit their spawn.

Compared with the fine Scandinavian char, their British and Irish relatives exhibit the characteristics of a dwindling and deteriorate race, which Günther arranged in five distinct species,[2] but such elaborate classification will not stand. The occurrence of char in a very small percentage of lakes in the British Isles, and their strict segregation for thousands of years, prohibiting all admixture of different colonies, are quite enough to account for some variation in colour, form, and even structure among fish of a single species inhabiting widely separated sheets of water. Especially is this the case with members of so exceedingly plastic a genus as *Salmo*. Char from different lakes do not

[1] Op. cit., p. 842. [2] *Study of Fishes* (1880), pp. 645-6.

vary from each other more than a Wycombe trout does from a little black fish from a peaty tarn on the Moor of Rannoch; and although Günther did invent a multitude of species out of our native *Salmo fario*, his arrangement has been rejected as untenable by present-day ichthyologists. It is true that, while char of one lake may differ considerably in appearance from those of another lake, the char population of any lake do much more closely resemble each other than do trout taken from any one lake or stream. This characteristic strengthens the hypothesis of distinct species, but it is owing merely to the fact that char habitually swim at a great depth, where the dim light takes uniform effect upon the skin; whereas trout frequenting shallower water have their colouring altered and adapted to a variable environment. To follow Günther in setting up specific distinction between the *torgoch* of Llyn Quellyn, the char of Windermere, the *gally-trough* of Lochleven (now extinct), the 'red-wame' of Loch Grannoch, the *tarrdhearg* of the Scottish Highlands, and the *murnin* of the loughs of Mayo, is to plunge into interminable confusion. Whether they be classed as *Salvelinus umbla* or *S. alpinus* matters no whit, provided we keep them in mind as one of the most conspicuous survivals of the reign of ice in our islands; a slowly vanishing race, still maintaining existence in a few scattered and profound meres and lakes.

As noted above, char no longer exist in Lochleven. The level of the lake was lowered 4½ feet about 1830, which no doubt affected the mean temperature. This

operation was fatal to the char and highly beneficial to the trout; the last char recorded was taken in a net in 1837 near Kinross House Pier. The char of Lochleven must have been far superior to those of any other Scottish waters, unless the local fishermen were 'pulling Pennant's leg' when they told him, about 1773, that they ran to a length of 2½ feet.

The habits of British char prevent its being reckoned a good sporting fish. Far less patient of warmth than the common trout, it lives and feeds in deep water; and although it is said that bumble-clocks and winged ants do tempt char to the surface in cool autumn calms, it can scarcely be worth anybody's while to go fly-fishing for them. The utmost one may expect, even in a lake containing thousands of char, is a brace or two of these lovely fish in a full basket of trout. They are taken in Windermere and the neighbouring lakes on a spoon-bait attached to a plumb-line, but that is not a very exhilarating form of the gentle art; neither is the method employed by a local angler in Gaits Water, who, as recorded by Mr. John Watson, took seventy char in a day, using a grub as bait.[1] By far the largest number of char are netted, the annual average from Windermere alone being about 4000 lb., valued at 1s. per lb. Net fishermen have to pay £1, 13s. 4d. for a licence, and plumb-liners 5s. As the close season for char on Windermere is the same as for trout—from 15th September till 10th March—the fish of this lake enjoy a salutary protection which is withheld from Scottish char. These are netted, sad to say,

[1] *The English Lake District Fisheries*, by John Watson (1899), p. 207.

when they enter the shallows to spawn, and the best that can be said for so barbarous a practice is that it is a beautiful sight on a bright October morning when the net is drawn ashore and the fish are seen flashing their ruby sides in the clear water. For the table, they are certainly not at their prime at that season; better, however, than those which seem to have contented the Duke of Montagu, who is shown by the following letter to have been content with spent fish!

LONDON, *January* 27, 1738.

MR. ATKINSON,—I received yours the 1 of this month, and also the Pott of Charr which you sent by that day's Carrier, which was the best I ever eat, and I would have you send me some of the same sort by every Carryer, take care to Pick the hen fish and those that are of the Red Kind, and let them be potted and seasoned just as that Pot was, for it cant be beter.

As I recon it is now the best season for Charr, I would have you send me some fresh ones, directed to my Lord Lovell who is Postmaster Generall, as you did the year before last, which I think was by an express, but these came in a wooden box, which made it a great weight for the Post to carry conveniently, therefore these should be put into some sort of a basket and the fish packed in it in moss or some sort of thing that will keep them from bruzing and not give them a taste. You let me know what day they will be in town that I may give Ld. Lovell notice of it that they may not lye at the Post Office.

Let them you send me be well chosen fish, and all of the Red sort. . . . I am, yours, MONTAGU.

We wish his Grace joy of a parcel of char after a journey of four days!

The British char, by its haunts and habits, bespeaks

association with an Arctic environment. It cannot brook the tepid meres of the midlands nor the sun-shrunk rivers of the north. It lingers only in mountain lakes of glacial origin where its progenitors established themselves when the ice-field was disappearing from our islands. How they obtained access to these lakes, and how they have disappeared from others of similar character, is part of the attractive mystery which surrounds them. That their presence in certain waters may be due to human agency is proved by the following bit of experience.

Loch Ossian is a sheet of water about four miles long in Inverness-shire, lying at the height of 1250 feet above sea level. It is surrounded on all sides by the mountains forming Corrour Forest, except on the north, where its waters escape down Strath Ossian to join the Spean near the foot of Loch Laggan. Beinn-na-lap (3006 feet) and Cnoc Dearg (3433) heave their massive shoulders between Loch Ossian and Loch Treig. Char have long been known to exist in Loch Treig, but not in Loch Ossian, though it is a lake similar in all respects to the other, but of 500 feet higher altitude. Loch Ossian swarms with diminutive trout; one only requires patience to pull out a hundred or two with the fly on any day when the wind is seasonable; sweet are they as a breakfast dish, but wae's me! they are sma', sma'.

Well, some six years ago or so we were assembled, a family party, under Sir John Stirling Maxwell's hospitable roof in perfect June weather. The ladies having prepared tea for us by the loch side, we defied

the midges and gathered round what Cowper would like to have called 'the hissing urn,' but what the faithful chronicles must tamely record as a couple of thermos flasks. One of the party who had spent the afternoon fishing joined us as we sat there, and turned out the contents of his basket for inspection—forty or fifty trout of the usual sprat-like dimensions. I was fingering them idly when presently to my great surprise I spotted a char—and then another. Yes—there was no mistake in the matter: here were a couple of veritable char, where no char had ever been heard of before.

Now, although there is no more productive hunting-ground for the field-naturalist than our own beloved land, hunters abound out of all proportion to its area. Every mountain and plain, every lake and river, every line of coast, have been so overrun by specialists in all the 'ologies, that the odds are a million to one against anybody who is not a specialist discovering anything fresh or adding one jot or tittle to the sum of knowledge. Had this outside chance befallen the humble individual who pens these lines? Was his obscurity at last to be illumined by the subdued but lasting lustre kindled by the discovery of a new species or subspecies? If Dr. Günther was justified in classifying one kind of char *S. Willughbii*, and another *S. Grayi*, what hindered that another should be inscribed *S. Maxwelli*? which would be all the more appropriate as it would involve my host and myself in a common glory, or, let us say, in a faint ray of distinction. *Non cuivis contingit*—it is not every man's destiny to discover a new char:

'The last infirmity of noble minds' was afire at once—the appetite for fame. The little fish were tenderly conveyed to the lodge, and before bed-time had been corked up in spirits for transmission to Mr. Boulenger, Father of Fishes, at his palace in Cromwell Road.

Alas for the vanity of human wishes! Next morning my host, happening to meet the head stalker, asked him whether he had ever seen or heard of char in Loch Ossian.

'Never,' was the reply that quenched all prospect of fame; 'never till Sir Herbert put them in five years ago.'

Then, and not till then, so treacherous a jade is memory, did I remember having sent a hundred young char from a hatchery to be turned into Loch Ossian. I had completely forgotten the circumstance, and had Sir John Maxwell parted with his stalker after it took place, the origin of Loch Ossian char would have been assigned to the far-off day when they swam on the flanks of the dwindling ice-field.

XXVIII

Most plants that enjoy the faculty of producing flowers or seeds in their first or second year of growth are content to do so at a few inches above the ground, especially if they flower in spring or early summer, before the uprush of stronger growth takes place. Of such are perennials like the daisy, the dandelion, and the primrose, and many annuals like the summer cress (*Cardamine hirsuta*), that irrepressible little weed that swarms in our

Climbing Plants

borders.[1] Other perennials, like the stonecrop, inhabit ground so poor and parched, or, like the sundew, so wet and sour, that they run no risk of being smothered by rampant rivals. Others again, like the foxgloves and mullein, are endowed with the power to send up a stout flowering stem to a height of several feet, whereby they escape suffocation. Such plants, however, that are exempt, while young, from the obligation to perpetuate their species, employ their time in building up a woody stem that, in some species, continues to increase in bulk for hundreds of years. The beech, for instance, never flowers and fruits till it is forty years old.

There is, however, another class of plants which, being unable to form stems strong enough to bear aloft their foliage and flowers, have recourse to robust neighbours for support. There are four expedients available for plants in that predicament, namely, leaf-climbing, tendril-climbing, root-climbing, and simple twining.

There is no better example of a leaf-climber than the clematis or virgin's-bower. The stalks of the young leaves are exceedingly sensitive, and the leaves themselves continually move about, independently of the wind, groping for support. As soon as a leaf comes in

[1] Sir Joseph Hooker devoted much attention to this weed. He entertained a well-rooted objection to the unnecessary multiplication of species. The older botanists had assigned specific distinction to the various forms of *Cardamine* in Europe, Asia, Africa, and America. Hooker resolved them all into one. 'I wish,' he wrote to W. H. Harvey, who differed with his diagnosis, 'that you had spent as many hours over this wretched weed as I have.' Again, to Charles Darwin: 'The little *Cardamine* or Cress I prove, by comparison of about fifty states of it running through the whole continent of S. America, to be the same as the most common European weed, *C. hirsuta*.'

contact with a twig, a cord, or a wire, it wraps its stalk so firmly round it that, when a few days later the tissues have hardened, it is impossible to unclasp it without a fracture.

The action of tendril-climbers may be conveniently studied in the common garden pea,[1] in which the leaf-stalk is produced beyond the leaf in the form of a wiry, sensitive organ—a feeler like a green thread two inches long, or more. While the main stem of the plant revolves spirally on its own axis in its upward growth, the tendril moves independently, waving in circles or, to be accurate, in ellipses. Darwin watched a tendril of the common pea and found that it described a complete ellipse in one hour and thirty minutes. This double movement of stem and tendril is pretty sure to bring the latter into contact with some form of support, whereupon the tendril immediately wraps itself firmly round it.

The most familiar type of British root-climber is the common ivy, which is able to emit what are called aerial roots along the whole length of its stem and branches, thereby clinging closely to a wall or tree and rising to an indefinite height. The precise action of these rootlets is not, I believe, thoroughly understood. Experiments with the creeping fig (*Ficus repens*), often cultivated in greenhouses, proved that

[1] I never write the word 'pea' without a mental apology, forasmuch as, rightly speaking, there is no such English word. In Middle English the plant was *pese*, and its seed was expressed by the plural *pesen*. But we have come to talk glibly of 'a pea,' just as we talk of 'a cherry,' through our ancestors, when they borrowed the French word *cerise*, believing it to be a plural form.

when the plant was allowed to run over glass the rootlets emitted a slightly viscous fluid. Probably the plant, having done so, reabsorbs the watery part of the fluid, leaving the rootlet glued to the surface of the support.

The fourth and last class of climbing plants is the twiners, that is, plants which wind their stems round the support they require. When the seedlings of such plants first appear, they behave in the manner common to ordinary herbs; but after two or three joints have been formed, the seedling begins to bend and revolve, seeking for support. When it finds this, it grows very rapidly, winding its stem round and round the stake or stem that it has found. It is remarkable that, while the majority of twiners revolve from left to right—that is, against the sun and against watch-hands—others revolve with the sun, from right to left. Among the majority are to be reckoned *Convolvulus*, *Wistaria*, *Berberidopsis*, *Stephanotis*, and *Aristolochia* or Dutchman's pipe; while the minority includes the hop, the honeysuckle, *Lapageria*, and a few others. In all these cases, and many others, the plant never varies from the hereditary habit. Darwin devoted much attention to this matter, and entered very fully into it in his volume on *Climbing Plants*. He could find only three species, all exotics, that ever twined in both directions.

'*Solanum dulcamara* revolves and twines in two directions; this plant, however, is a most feeble twiner. *Loasa aurantiaca* offers a much more curious case. I raised seventeen plants; of these, eight revolved in opposition to the sun and ascended

from left to right; five followed the sun and ascended from right to left; and four revolved and twined first in one direction and then reversed their course. . . . Another plant in the same family, *Scyphanthus elegans*, habitually twines in the same manner. I raised many plants of it, and the stems all took one turn, occasionally two or even three turns, in one direction, and then, ascending for a short space straight, reversed their course, and took one or two turns in an opposite direction. . . . Had I not seen this case, I should have thought its occurrence most improbable.'[1]

I am now able to add a fourth anomalous twiner, which, however, was not known to botanists in Darwin's day. Everybody knows the common aconite, monkshood or wolfsbane (*Aconitum napellus*), which rears its spikes of blue flowers in June on stiff stems two or three feet high. Twenty years ago, or thereby, a new species was discovered in China, which, growing naturally amid thick scrub and dense woodland, had to struggle for light and air by sending up stems to a height of eight or ten feet. Being unable to give these stems, which die back to the ground every year, enough substance to stand erect, it had recourse to twining, and winds up the stems of shrubs and trees. Contrary to the all but universal habit of twiners, this plant revolves indifferently with the sun or against it. In a specimen growing not many yards from where I am sitting, the first two turns of the stem are from right to left, with the sun; the next five are from left to right; then follows an upright internode, after which come two turns from right to left, and the spiral finishes with one turn from left to right at the top

[1] *Climbing Plants*, p. 34.

of the support, where the plant has broken out in a cluster of flowers—the characteristic blue helmets of the genus.

It is to be noted that the perpetuation of the various species of climbing plants depends absolutely on their being able to secure support to carry them clear of the ruck of vegetation into light and air. Thus the common ivy, which closely carpets so many of our west-country woods, may live as a carpet for an indefinite time—centuries perhaps—but is utterly unable to produce flowers or fruit until it has reared itself up on a tree, a crag, or a wall.

XXIX

A Lost Opportunity

I doubt whether any animal, vertebrate or invertebrate, aquatic or terrestrial, has been the cause of such an aggregate of execration as the common—too common—midge. I have heard the discharge of language, with which I should be sorry to soil these chaste pages, against rats, rabbits, the beaten favourite in a handicap, caterwauling cats, and headstrong retrievers; but these were transient aggravations; a volley or two of swear-words served to relieve the sufferer. But when midges are out for blood they stir blasphemy at depths hitherto unplumbed; and if flight be impossible for their victim, they bring up their reserves in inexhaustible numbers, and never desist from the attack so long as he remains on the field. The aggregate, therefore, of execration discharged at these insatiate females (doubtless the male

midge would bear his share in the fray were he suitably armed, but he has no organ to bite or suck withal) must be incalculable.

Having already dealt succinctly in these notes with what specialists have learnt and taught about the natural history of midges,[1] I have nothing more to say on that head. My purpose is to make a clean breast of it by relating how I suffered ignominious defeat under the assault of myriads of *Ceratopogon*.

The Water of Luce, flowing into the head of Luce Bay, is famous for the abundance and goodly size of its sea-trout, and in the first flood after mid-summer one may reasonably expect a pull from salmon or grilse.[2] It is a pretty angling stream when in fishing trim, rolling its dark-brown waters through rocky gorges, anon pouring them swiftly between piles of flood-borne shingle or sweeping in tranquil curves under cliffs draped with birch and rowan. As a salmon river she has but two drawbacks. First, she runs out so fast after a flood (especially a summer spate) that one must catch her on the hop, so to speak, or miss the chance of a fish. For instance, it is recorded in my fishing book that there was a tremendous flood on 21st October 1870, which drowned thirty sheep on a meadow just above the railway viaduct. That was in the morning. I arrived from Edinburgh that evening at 4.30 P.M.; there was still an hour of daylight; I hurried down to the river just below the viaduct, found it still very high, but fishable,

[1] *Memories of the Months*, fourth series, pp. 282, 283.

[2] The local term for grilse is 'graul.'

and before nightfall landed a 16-lb. fish on the fly. The water must have fallen about four feet in twelve hours.

The other drawback is the midges. They rise in clouds from the heather on the upper beats, where a brisk breeze serves to disperse them; they stream out of the wooded banks lower down, where the summer wind seldom comes to the angler's relief; nearer the sea, the saugh bushes seem planted for the very purpose of harbour for the bloodsuckers. I recollect one sportsman who had the temerity to go a-fishing arrayed in a kilt. His beat lay among the moors—about the Loups o' Kilfeather and the Slittery Craig. It was a windless day, and the heather sent forth its customary hordes, which availed themselves eagerly of such an unwonted expanse of 'face,' for the garb of Old Gaul is not habitually worn in Galloway. The old gamekeeper who acted as gillie for the stranger described the scene vividly. 'He was fair mad, the body. He lay doon on the heather and rowed [rolled] and rowed himsel', and cried Da-a-amn!'

But to my tale—a brief one, and the reverse of creditable. We always reckon one good flood in July as better than two in August. The fish are apt to turn sluggish after Lammas; whereas if a fly is offered to a fish in July he is pretty sure to move to it. Well, in 1909 it rained torrents on 21st July until the morning of the 22nd. The Luce runs sixteen or eighteen miles from my dwelling—say an hour's run in the Daimler. I had no means of knowing the state of the river, but guessed that if she were too high at noon,

she would run into trim before night, which in this latitude does not fall till near ten o'clock about midsummer. On arriving at the waterside, she was still too big, but of a fine, clear, porter colour, and falling. In every river, no matter how big, there are certain places that will fish so long as the water runs clear; and the Luce, with most of its course laid in moorland, seldom turns 'drumlie.' The tail of the Craig Stream seemed as likely as any place to give a fish, so we drove on four miles to try it. The river here passes under a high wood on the right bank. Not a breath of air was stirring, and it was very sultry. The stream was too heavy at the top, but half-way down it subsides into a broad, even flow, and near the tail some great boulders cause a swirl in the current. Here, if anywhere, there ought to be a fish, and sure enough, as I passed up the bank a salmon rose head and tail just above the swirl.

Beginning about forty yards higher up with a smallish double-hooked Black Doctor, I was instantly assailed by clouds of midges. Never do I remember to have been so heavily plastered with them. The atmosphere seemed to be composed half of motionless air and half of midges. It was maddening. Nothing happened till the Black Doctor swam in a nice sweep just above the boulders, when — twang! the line tightened, and for the next five minutes I forgot my tormentors. Remembered them again, though, so soon as a clean-run nine-pounder had received the *coup de grâce*. Howbeit, half-a-dozen casts and I was into another fish; but this fellow got free after running

about for a bit. By this time I was at the end of the cast, suffering horribly from my tormentors—the itching, pricking, and tickling being as near intolerable as physical sensation may be. It was as near certainty as anything in angling can be that if I fished the Craig Stream over again I should get another fish or two, for I had seen some moving. Could I face it? I blush retrospectively to state that I was not enough of a pachyderm to do so. Below the teeming wood was the open strath, where there could be more air and fewer midges. There were some good casts there and—in short, I fled, leaving a moral certainty for what was most uncertain.

Fronte capillata post est occasio calva.

Here was I with *occasio*—fortune's forelock—well within my grip, and I let it go, hounded off by swarms of micro-organisms. No more *occasio* that day, unless a brace of good sea-trout may be accounted such.

XXX

The Divining Rod

In the first series of these *Memories*, after describing what had come under my notice in the proceedings of a 'dowser' or professional water-finder, I summed up the agnostic impression made on my mind thus: 'I don't believe in the divining rod, but I don't deny that its virtues are genuine; and were I in straits to find water, I should employ without hesitation a professional water-finder

—rod and all—if there remains one so successful as Mullins was.'[1]

Well, that was written two-and-twenty years ago, and in that interval I *have* been in straits to find water and I *have* employed, not a professional, but an amateur dowser, with thoroughly satisfactory result. Our County Council having condemned open springs for the domestic supply of water and called upon land-owners to provide covered wells, I found myself under the necessity of sinking no fewer than ninety-five wells. In ninety-three cases water was found without difficulty; wells were sunk and equipped at an average cost of £25, or £2,375 in all. But on two farms we were defeated; we failed utterly to hit upon a supply.

Hearing of our dilemma, Mr. Howson, a gentleman of Lancashire, most kindly offered his assistance as an amateur dowser. He had never been on the ground before,[2] but he came, he saw, he conquered. He walked at high speed over the fields, quartering the ground as a well-trained pointer might do, and carrying before him, not the traditional forked hazel rod, but a piece of stout, twisted wire, bent to form an acute angle, with an end held in either hand. On both farms he indicated a spot where we should sink a well; we did so and found an ample supply in each place, which has never failed in the ten years that have gone by since.

Some years previously, desiring to sink a well in the garden, I had availed myself of the power of a lady

[1] *Memories of the Months*, first series, pp. 84-7.

[2] The geological formation is Lower Silurian rock, overlaid with glacial drift, the surface soil or tilth being rather light gravelly loam. The land lies in a series of low ridges, and is under arable rotation.

friend who had the gift of 'dowsing.' She went all over the ground, and her rod (an orthodox hazel this time) indicated one spot, and one only, where water would be found. The well was never sunk, and I bethought me of trying whether Mr. Howson's wire would correspond in its action with that of the lady's hazel. I took him over the whole ground, and, sure enough, at the very same spot his index turned smartly up.

He then proposed that I should hold the two ends of the wire, while he grasped my wrists. I was determined that the wire should not move if I could prevent it; but in spite of that, up it went at the same place as it had bent in his hands. I was conscious of no sensation, except the pressure of the wire.

Now if that were all, though the demonstrations were of permanent benefit to myself, they would scarcely be worth recording here and now, the skill of water-diviners being very generally acknowledged even by those who disbelieve in any cryptic agency. But there was a good deal more. First, let me claim due attention to the fact that Mr. Howson is no professional dowser working for remuneration. He is a highly educated man, well versed in the management of land, and with no theory about the source or nature of his peculiar gift. Asked whether he attributed it to electricity or any other agency—'I have not the slightest notion what it is,' said he; 'I wish that somebody could tell me.'

'Do you experience any sensation when the rod moves?'

'None whatever. The rod itself is merely an index. Anything with an apex will serve as well as another.'

'Do you find the exercise of your power exhausts you?'

'No. Of course I get tired after hunting for water; but not more so, I think, than the mere fatigue caused by walking.'

We were sitting at luncheon one day, eight or ten of us, when Mr. Howson asked whether we would care to see some further experiments with the divining rod. Of course we agreed. He then said that if he might take the 'power' of any one present by touching him or her with the point of the wire that served him as a rod, that person might go out into the park or woods or anywhere and that he would follow his or her footsteps at any time within, I think he said, 36 hours. So we sent out a young lady, whose 'power' he took in the manner prescribed, pressing the point of the wire on her arm. We gave her a ten minutes' start, and then set forth in pursuit, guided by the diviner. It was impossible that there should be any collusion between pursuer and pursued, for it was I who asked the lady to submit to the experiment, and Mr. Howson had never met her till just before we sat down to luncheon. It was equally impossible that he should have seen from his seat at the table the direction she took in her flight; yet he hit the trail at once, followed it step by step, the index pointing upward when he was right and rising to horizontal when he went astray. Our operator followed that young woman across a wide lawn, into a wood on the far side, where she had described a considerable circuit, returning to the flower-garden near the house. Here Mr. Howson got confused.

'There are several tracks here,' said he; 'I am afraid I am beaten this time.' It turned out that the young lady had been in the garden before luncheon gathering flowers!

The next chase ended more satisfactorily. A male member of the party was sent forth, his 'power' having been duly taken, and, after prolonged pursuit, was run to ground. This brought to mind how Vallemont, writing towards the end of the seventeenth century about *baguette directoire* (which it was considered essential should be of hazel), describes its employment in tracking criminals.

Even more perplexing was Mr. Howson's next demonstration of his power. He bade us arrange round a table a number of pieces of crockery—porcelain, delf, stoneware, etc., three or four of each manufacture. We did so, and allowed the operator to 'take the power' of one piece of a set. He was then brought into the room blindfold, was led round the table, and with his rod picked out the pieces of the set of which he had taken the 'power.'

After removing the bandage from his eyes, we put before him four 'bellarmines' or 'greybeards,' those quaint stoneware jugs manufactured in the Low Countries and Germany in the sixteenth and seventeenth centuries and imported to Britain containing Hollands or other spirit. Three of these had recently been dug up near the old castle here; the fourth had been purchased in London. The rod indicated that the four jugs were not of identical make, but that they were of different lots; I forget whether two or three.

This, of course, we could not check as we were able to do in the other experiments.

Having now described what took place in the presence of several persons besides myself, I have no explanation to suggest. I know not whether the phenomena are physical, or psychical, or both; only of this I am confident, that pretence or deception are out of the question, Mr. Howson being absolutely above suspicion in that respect. I have failed in repeated attempts to persuade men eminent in physical science to apply strict inquiry into the nature of the dowser's craft. The view usually taken is that the operator, unconsciously or semi-consciously, exerts muscular tension on the rod when his training or experience enables him, as it were automatically, to detect the presence of water. It is obvious that this is not applicable to some of the manifestations described above; but there I must leave it, retaining only the strong impression that certain individuals are gifted with a power with which others are not endowed, or are sensitive to an agency to which others, including myself, are insensible. I am of opinion, also, that the subject is one that is deserving of scientific inquiry, and that it should no longer be shelved with a sceptical shrug of the shoulders.

August

XXXI

Crustaceans

How truly did Charles Kingsley write in the *Water Babies*: 'All the ingenious men, and all the scientific men, and all the fanciful men in the world, with all the old German bogey painters into the bargain, could never invent anything so curious and ridiculous as a lobster.' A casual observer might conclude that a lobster, being cased in plate armour *cap-à-pie*, should be more immune from injury than most other creatures. He cannot bark his shins, nor sprain an ankle, nor suffer from toothache (which, I take it, constitute three of the sorest minor miseries of human existence), seeing that he possesses neither shins, ankles, nor teeth. It is true that, being insatiably pugnacious, he may lose a limb or two in intercourse with his kind, but *pazienza!* the lost member will be replaced in a short time.

A lobster's armour has but one defect; it requires to be shed at intervals. The creature thrives and grows, but his rigid panoply remains of the original size; wherefore what was at Christmas a faultless fit, has become by Eastertide unendurably tight. It is calculated that a four-year-old lobster, measuring ten inches in length, has outgrown and had to cast away

five-and-twenty suits of armour, thereby passing through as many intensely anxious, and perhaps painful, crises. If the old suit cannot be skilfully slipped off, the animal must inevitably die in torment similar to those caused by the mediæval *peine forte et dure*.

Even when all goes without a hitch, the lobster, after casting his coat, remains in a soft and highly vulnerable condition for more than a month, during which he is diligently sought for as a gastronomic delicacy by cod, skate, and other predatory fish (and in our waters there are precious few fish that are not predatory). Taking one consideration with another, the lobster's life, like the late Sir W. Gilbert's policeman's, is not a happy one; for, apart altogether from human persecution, the rate of mortality among adolescent and adult lobsters must be very high. Fortunately they are a very prolific race; one female, eighteen inches long, having been known to produce as many as 160,000 eggs in a single season.

These reflections have been suggested by a glance through the fascinating pages of the tenth and last volume of the *Cambridge Natural History*, a work so thorough and valuable that one may not complain that sixteen years have run between the first and last issue. Moreover, there exists a melancholy excuse for delay in completing the series in the death of Professor Weldon, who had the volume dealing with Crustaceans in hand. This was no work for a 'prentice hand, for crustaceans populate the waters almost as thickly as insects do the air. The foundations, so well and truly

laid by the deceased professor, have been built upon in workmanlike fashion by Mr. Geoffrey Smith; so that we have now in the complete series a succinct manual of the whole of animated nature in accordance with the latest scientific research.

To give an exhaustive account of crustacean life would require not one volume, but many volumes. Yet, although the editors of the Cambridge series have adopted a popular standard, it is popular in the best sense of the word; there is nothing superficial—nothing to gratify a mere appetite for the wonderful; their purpose has been to use language intelligible to readers devoid of specialised training.

And in no branch of zoology is concentrated specialism more needful than in the study of crustacean life. The great majority of creatures in that class, as has been said, inhabit the water, which is a serious obstacle to amateur observation; when it is added that myriad species are microscopic, and that it is in Arctic and Antarctic seas that they most greatly abound, the individual who applies himself seriously to master their biology, classification, and habits can have little time left for any other work.

Copepods, minute crustaceans, whereof different species inhabit salt or fresh water, exhibit the most fantastic variety of structure. It is perhaps well for us humans that they are of microscopic proportions, that we cannot examine them except through a powerful lens, and need not do that unless we choose. For if a lobster is a freak animal, some of these copepods are veritable nightmares, and it would be at the risk of a

severe nervous shock that the boldest man should come suddenly upon one, say, as big as a sheep. For instance, take *Calanus hyperboreus*, one of the commonest of marine copepods, represented on page 56 of the volume before me,—one can hardly imagine a more terrifying apparition than this creature would present if, instead of measuring an eighth of an inch from snout (or where the snout *should* be) to tail-tip, it were six feet long.

Microscopic in scale though these creatures be, they make up for diminutive proportions by their incalculable numbers. Sometimes they appear in such swarms as to alter the appearance of the ocean. The aforesaid *Calanus* often makes the sea appear blood-red for miles—a welcome spectacle for herrings and other pelagic fishes which consume enormous quantities of them. Then the familiar phenomenon of phosphorescence (or, as Mr. David Sharp has pointed out, what should more correctly be termed luminescence, seeing that phosphorus is not the illuminating agent) in the sea has been traced to various species of copepod, but no ingenuity or patience of research has served hitherto to furnish so much as a suggestion of purpose in the display. The female glow-worm, being wingless, probably lights her lamp to guide her strong-flying lover to her embrace, as Hero did for Leander. On the other hand, although—

> 'Some think fireflies pretty when they mix in the corn and mingle,
> Or thrid the stinking hemp till the stalks of it seem a-tingle'—

these fireflies are almost without exception males. It has been suggested that their nocturnal evolutions are intended to captivate the sense of their lady friends,

and we are all familiar with the irresistible attraction which bright light has for insects. But in a swarm of billions of trillions of minute crustaceans it baffles imagination to conceive of individual preference.

Equally obscure is the purpose of the plume-like decoration of many species of these living atoms, which for extravagance and complexity of design can scarcely be matched even in the headgear of feminine humanity.

Although some copepods are parasitic upon fishes (salmon anglers are familiar with some of them), the majority are free living, some being vegetarian, others either scavengers or actively predaceous. Arctic naturalists, we are told, are wont to turn the services of another order of pelagic crustaceans—*Amphipoda*—to serviceable account. When it is desired to obtain the skeleton of a bear or seal, all that needs to be done is to hang the entire carcase over the side of the vessel, leaving it immersed for a few days, when the bones will be found to have been picked perfectly clean by myriads of little amphipods. The so-called fresh-water shrimp (*Gammarus pulex*), beloved of trout, and the sand-hopper (*Talitrus* and *Talorchestia*) belong to the order *Amphipoda*.

It is impossible for any one who is not a specialist in that branch of research to which Professor Weldon and Mr. Geoffrey Smith admit us to some insight, to rid himself of a sense of wonder. It is absolutely true, of course, that one natural phenomenon is not really more marvellous than another. Sunrise and sunset, a snowdrop pushing through the cold earth in

midwinter, the migration across the sea of a landrail—a bird of such languid flight when flushed that it seems hardly able to reach the far side of a turnip field (and generally doesn't)—these and thousands of other phenomena that happen under our indifferent eyes have ceased to astonish us, though the forces that regulate them are far beyond our control or understanding. It is when there is revealed to us the existence of myriads of organisms, whereof the complexity and variety baffle our power of comprehension, that we are overwhelmed with a sense of the limited range of our knowledge, and we take refuge in astonishment.

'The fool hath said in his heart there is no God'; and in sooth men have invested the Supreme Ruler with such contradictory attributes, fenced Him off with such elaborate ceremonies and insisted upon such illogical dogmas about Him, that many thoughtful students have inclined, silently or otherwise, to the conclusion that the said fool was not so far wrong. But as the light of natural science broadens, the most advanced minds are feeling more and more that the whole scheme and substance of the universe and its inhabitants are unintelligible without the postulate of a Controlling Power. It is easier to accept—at least it seems more consonant with reason to accept—the most exacting mandates of empirical and dogmatic theology than to hold that ourselves, the globe we inhabit, in common with an infinite variety of other animated creatures, as well as an incalculable multitude of other globes and their inhabitants, are the product of 'the

fortuitous concourse of atoms.' Fortuitous the concourse cannot be, for atoms act in accordance with decipherable rule. To deny the existence of a Creator is merely to shelve the problem out of reach, shirking the question of origin of the atoms and of the unerring code with which they comply.

But I have been led far further than I intended when I laid down the Cambridge volume on Crustacea!

XXXII

Spiders

Crustaceans are recognised in classification as belonging to the same *phylum* or nation as insects, myriapods, and arachnids, 'which,' observes Mr. Shipley in dealing with Arachnids in the *Cambridge Natural History*, 'from the point of view of numbers of species and individuals, is the dominant one on the planet.' The Arachnids cover a very wide range of form and habit; and among them perhaps no order of animals exhibits such a strange combination of indiscriminate ferocity, domestic solicitude, and constructive skill as the *Araneæ* or spiders. One does not often meet with a man who repines because he has not been born a girl; nor, meeting such an individual, is one likely to hanker much after his society; but nobody can read Mr. Shipley's account of the relations prevailing between spiders of different sexes without concluding that the males of that race have good cause to wish that they were females.

'The strange peril braved by the male in courting the female, which has, as far as is known, no parallel in any

other department of the animal kingdom[1] . . . may be verified by any patient observer in the case of the large garden spider (*Epeira diadematа*). . . . During the mating season the males may be looked for on the borders of the nets of the females. Their action is hesitating and irresolute, as it well may be, and for hours they will linger on the confines of the web, feeling it cautiously with their legs, and apparently trying to ascertain the nature of the welcome likely to be extended to them.'

If the lady is inclined for dalliance, the suitor is admitted; but it behoves him to make tracks so soon as his purpose has been accomplished. If he is so simple as to accept an invitation to stay for supper, his own carcase will assuredly be the *pièce de résistance* at that meal: his mistress will promptly give him a deadly bite in the throat, and sit down to imbibe his juices. In almost all species of spider the male is considerably, often absurdly, smaller and weaker than the female. In the tropical species *Nephila* the female is about two inches long and thirteen hundred times heavier than her temporary spouse, who scarcely exceeds one-tenth of an inch in length.

'This disparity of size,' says Mr. Shipley, 'is thought to have a direct connection with the danger undergone at the mating season. Small, active males have a better chance of escape from ferocious females, so that natural selection has acted in the direction of reducing their size so far as is compatible with the performance of their functions.'

[1] Mr. Shipley is referring to the whole *phylum* of Arachnids, not to spiders only. The females of the praying mantis and of several species of beetles exhibit similar revolting ferocity towards their mates.

Perhaps it would be wise to regard the inference drawn herein as *obiter dictum*. The male, no matter what his dimensions, is always allowed to impregnate the female before she devours him.

If female spiders disgust us by their horrible feasts, poetic justice may be traced in the torments inflicted upon them by certain species of winged insects, a class of creature upon which spiders habitually prey. For instance, there is a species of ichneumon fly (*Polysphincta carbonaria*) which deposits its egg on the broad back of the garden spider (*Epeira*), whence the victim is powerless to dislodge it. From the egg is hatched a maggot, which burrows into the spider's body and slowly eats it to death. Other ichneumons deposit their eggs in cocoons of various species of spider; but they do so at some risk to their own offspring, for if the spider's brood happens to be near hatching and the young spiders come abroad first, instead of being themselves devoured, they gleefully make a breakfast off ichneumon larvæ.

XXXIII

The Leaf-cutter Bee

Most of us visualise a bee synthetically as a restless creature that sucks honey at one end and stings viciously at the other, and we regard the race as composed, roughly, of the honey bee and two or three different patterns of bumble. In fact, however, upwards of fifteen hundred distinct species of bee have been classified, and the life histories of those that have been studied are of extraordinary interest.

Bees are divided by entomologists into six or seven groups, whereof one is composed of social bees, that is, bees living in an organised community and working co-operatively; the rest being known as solitary bees, working independently in pairs. It would take a very fat volume to describe the amazing variety in the habits of the various species—their architecture, the provision they make for their offspring (which most of them are destined never to see alive), and the cunning devices to which they resort for the defence of their nursery. Here I propose to call attention only to one species of a genus represented in Britain by several others.

Those who cultivate roses must have noticed sometimes that the leaves of their bushes have been disfigured by numerous circular pieces, each the size of a sixpence, having been cut out of them. This is the work of a species of leaf-cutter bee which confines its operations to roses. It belongs to the genus *Megachile*, meaning large lipped, so called because of a peculiar development of the mouth, which is specialised into an instrument for shearing the leaves of plants. This instrument, a greatly exaggerated *labrum* or lip, when at rest is bent under the head and enclosed within the mandibles, whence it is extruded for cutting the material with which the bee builds her nursery.

A working-man's wife sent me lately by post a decayed branch of gorse, hollowed out and filled with neatly shaped cylinders about three-quarters of an inch long, which my correspondent likened to green cartridges, and asked whether I could explain what

they were. They were the work of the rose-leaf-cutter bee. Each cylinder was built up of circular patches of rose-leaf, neatly fitted over each other in two or three layers, and apparently fastened with some adhesive substance. They were closed at one end and fitted with a hinged lid at the other; and each contained a fat white grub, which, having consumed the store of pollen provided for it by the mother bee, was about to turn into a pupa for six months' sleep, until the sun of next summer should cause its resurrection, bring it forth as a perfect replica of its race, and, at the same time, provide fresh young rose-leaves whereon to exercise its hereditary craft. The fidelity and industry with which these insects repeat year by year and century after century the complicated functions of their kind is truly pathetic, seeing that no mother, after depositing her egg in the green cradle and piling beside it a store of pollen for the prospective infant which she shall never see, flits about aimlessly for a few weeks in the autumn sunshine, till she turns drowsy in the chill of approaching winter, and falls asleep, never to wake again.

I have never noticed the rose-leaf-cutter use any other building material than rose-leaves; but there are leaf-cutting bees in most parts of the world, and each species confines its operations to one, two, or three particular kinds of plant. Réaumur described the habits of a leaf-cutter of the genus *Osmia*, closely akin to *Megachile*, which he named *l'abeille tapissière* (the tapestry bee) because it lined its nest with the scarlet petals of the corn-poppy.

Since writing this note I have referred to Fabre's essay on leaf-cutter bees, and find that probably I was wrong in supposing that *Megachile* supplied any glutinous fluid to cause the pieces of leaf to adhere in the construction of her cells. I shall allow the error to stand, partly from a lazy distaste for emendation, but chiefly because it affords excuse for quoting Fabre's explanation of the true process. I shall be well pleased if, in adopting this course, I happen to introduce any reader for the first time to the fascinating *Études Entomologiques*, by a master who had the rare gift of recording scientific observations and research in the form of exquisite literature:

'For scissors, *Megachile* has her mandibles; for compasses, producing now an oval and anon a circle, she has her eye and the pivot of her body. The pieces cut out are made into thimble-shaped wallets, intended to contain the honey and the egg; the larger oval pieces supply the floor and sides; the smaller, round pieces are reserved for the lid. A row of these thimbles, placed one on the top of the other, up to a dozen or more, though often there are less—such, roughly, is the structure of the leaf-cutter's nest. . . . The bag of leaves, as turned out by the worker, lacks stability. Its numerous pieces, not glued together, but simply placed one after the other, come apart and give way as soon as they lose the support of the tunnel that keeps them united. Later, when the larva spins its cocoon, it infuses a little of its fluid silk into the gaps and solders the pieces together, especially the inner ones, so that the insecure bag becomes in due course a solid casket whereof it is no longer possible to separate the component parts.'[1]

[1] *The Bramble-bees and Others*, by J. H. Fabre, translated by A. T. de Mattos, p. 254.

XXXIV

The Riddle of the Burbot

There exists in the eastward-flowing rivers of England, from the Yare of Norfolk to the Humber, including the Trent and all its tributaries, a fish called the burbot or, locally, the eel-pout. It is remarkable as the only member of the *Gadidæ* or Cod family known to inhabit fresh water. It owes its name of eel-pout (in Anglo-Saxon, *ælpút*) to its elongated body and distended belly; while the long wattle or barbule hanging from beneath the lower jaw explains the old French name *barbote*—the bearded one—whence the English 'burbot.' The barbel (*Barbus vulgaris*) is also named from four similar appendages hanging from the upper lip (French, *barbeau*), but belongs to quite a different family—the Carps. In appearance the burbot bears a general resemblance to its near relative, the ling, and its flesh is highly esteemed by those who have acquaintance with it; Leonard Mascall, to whom further reference will be made presently, describes it as 'a pleasant meate.' Although living and feeding on the bottom the burbot is furnished with a long air-bladder. In England it is seldom taken weighing more than 2 lb. to 3 lb., though Pennant talks of one from the Trent weighing 8 lb.; but in continental waters it runs to far greater size, being one of those creatures of a nature so plastic as to adapt their dimensions to accord with the food supply. Burbot of 30 lb. weight have been reported as taken in the Rhine, and of far greater weight in the rivers of Alaska.

The burbot (*Lota vulgaris*) has a very wide range, extending over Central and Northern Europe from the north of Italy to Scandinavia, and so through Siberia perhaps over Northern Asia. It abounds in many of the large lakes of Canada and the Northern United States from Maine and New Brunswick to the head-waters of the Missouri and in the waters of Alaska. The American burbot was formerly classed as a distinct species under the title of *Lota maculosa*, but I believe is now recognised as merely a geographical variant of *L. vulgaris*. Owing to its keeping to the bottom of the water and its British habitat being exclusively confined to the Trent system and a few other easterly flowing streams in England, very few anglers or fishermen are acquainted with it; many, I find, have never heard of its existence.

It is the distribution of this fish in British waters which seems to deserve attention as bearing, possibly, some significance in connection with geological problems. A denizen of fresh water only, it cannot live in salt water. The rivers which it inhabits—the Trent, the Yorkshire Ouse, the Nen, with the brooks and pools of the Fen district, and the Norfolk Ouse—are considered as having formed part of the Rhine system when that great river flowed northward through the plain now submerged under the North Sea. But the Thames, which geologists regard as having formed part of the same system, does not *contain, and never has contained, any burbot*, although that fish is plentiful in the Rhine. Its absence from the principal east-flowing English river and its presence in other east-flowing

English rivers, is remarkable; because, assuming that the Thames was connected with the Rhine system simultaneously with the Trent, etc., it would seem inevitable that a fish inhabiting every other part of that system would be found in the Thames also.

Unluckily the case has been obscured by the blunder of a printer's reader more than three hundred years ago, giving rise to the belief that the Thames did contain burbot at the end of the sixteenth century. A single passage in Leonard Mascall's *Booke of Fishing with Hooke and Line* (1590) has been quoted over and over again in evidence thereof. I have done so myself[1] before I discovered the mistake. In discoursing about the fishes of the Fen district, Mascall has the following:

'There is a kind of fish in Holand [that is, the south-eastern district of Lincolnshire] in the fennes beside Peterborrow, which they call a poult; they be like in making and greatness to the whiting, but of the cullour of the loch [loach]; they come forth of the fennes brookes into the rivers nigh there about, as in Wandsworth river there are many of them.'

Now the 'Wandsworth river' has been naturally taken to mean the Wandle, which flows into the Thames at Wandsworth; whence the assumption was easy that, although there are no burbot in either Thames or Wandle now, they were there three hundred years ago. But on reading the above quoted passage carefully, it appears evident that Mascall was writing only of the waters 'in the fennes beside Peterborrow.'

[1] *British Freshwater Fish* (1904), p. 91.

This led me to study the topography of that district, when it became clear that the reference was not to Wandsworth at all, but to Wansford (formerly written Walnesford), a village situated in a parish of that name on the Nen, about six miles west of Peterborough. By 'Wansford river,' therefore, Mascall signified the Nen, and a London printer, who probably knew Wandsworth and the Wandle, must be held responsible for setting astray many writers on natural history.

Now in hunting for a clue to the riddle why there are no burbot in the Thames, I naturally turned to the writings of the late Sir Andrew Ramsay (1814-91), sometime President of the Geological Society, who held very decided views about the formation of the Thames valley. In the course of his well-known work, *The Physical Geography of Great Britain*, he maintained that the lower valley of the Severn was one of the oldest in the lowlands of England, and that the Thames once drained into it—in other words, that the Thames formerly flowed from east to west, instead of from west to east as it does now. He held that the secondary strata south-east of the Severn once dipped towards the west, and shed their waters into that river; and that long after the Severn had carved its own valley, these Chalk and Eocene beds received a slight tilt towards the east, which sufficed, in Sir Andrew's opinion, to create a new watershed and a new river—the Thames —which scooped out an eastward course through the Chalk and overlying Eocene strata.

This promised, at first sight, to lead to an explanation of the absence from the Thames of the burbot,

which occurs neither in the Severn, nor in any other English rivers with a westerly or southerly course; but geological time interposes a bar to such a simple solution.

Even if Sir Andrew Ramsay's theory were demonstrably in accordance with fact, and the Thames once flowed westward into the Severn valley, the reversal of the flow towards the east must have taken place at a very remote geological period. Sir Andrew himself indicated the late Miocene as the time of the change, and accepted the view that thereafter the Thames became a tributary of the Rhine. But a vast deal has taken place since Miocene times, enough to baffle conjecture about the probable course of this river or that. Still, recourse must be had to conjecture in endeavouring to get at the secret of the absence of burbot from the Thames, and I venture to submit the following hypothesis which, I believe, is not inconsistent with the views held by leading geologists on the general effects of ice in Western Europe.

Many ages after the Miocene period, during which the Thames may be assumed to have flowed into the Rhine, perhaps uniting its waters with the Trent before its junction with the mightier river, there ensued in what is termed the Post-tertiary, Quarternary, or Pleistocene period a gradual refrigeration of the climate of the northern hemisphere, culminating in the Great Ice Age. In what is now Great Britain (at that time forming part of the continent of Europe) the conditions became such as to destroy all life, animal and vegetable, except such rudimentary organisms as it has been

proved can exist in extreme polar cold. 'First,' says Sir Archibald Geikie, 'there was a gradual increase of the cold, though with warm intervals, until the conditions of modern North Greenland extended as far south as Middlesex, Wales, the south-west of Ireland, and 50° N. latitude in Central Europe.'[1] In other words, the greater part of Britain lay for an unknown period under land ice thousands of feet thick, just as North Greenland lies at the present time. The ice-field does not appear to have extended south of the Thames, but it has left evidence of its presence as far south as that river, which was probably frozen solid every winter, and even if the brief summer prevailed to set it running again, the current must have been ice cold and thickly charged with glacial mud. That being so, it seems impossible that any fish can have survived in the Thames or in any of the easterly flowing rivers north of it. During the period of extreme cold a vast ice-field must have occupied the plain now covered by the North Sea, forming a continuous sheet extending from Scandinavia to what is now Great Britain. It was explained by the late Mr. Clement Reid that a barrier was thereby created through which the Rhine, powerful river though it was, could not force a passage.[2] It would simply add bulk to the barrier by its own waters freezing as fast as they reached the region of intense cold. The result of this great dam would be the formation of a huge lake, which found its outlet through what is now the Straits of Dover and flowed

[1] *Text-book of Geology*, p. 884.
[2] *Submerged Forests*, by Clement Reid, 1913.

along our south coast into the Atlantic, receiving in its course the waters of the south-flowing rivers.

With the return of temperate conditions the Rhine was free to resume its northerly course, and to receive once more the waters of the Trent and other easterly flowing English rivers. But possibly not the Thames. That river may have continued to flow through the new channel cut by the torrential outflow from the Rhine dam, in which case, being severed from the continental river system, it could receive from the Rhine no form of aqueous life that could not pass through salt water. It would be restocked with those species of fresh-water fish that had survived the glacial period in the open waters of the relatively warm region which the land ice did not invade. Such rivers, the Medway, the Aran, the Itchen, the Test, the Avon, etc., having never been connected with the Rhine, contained no burbot, which may be the reason for the absence of that fish from the Thames.

The other easterly flowing rivers, the Yorkshire and the Norfolk Ouse, the Nen and the whole Trent system, when released from the land ice, would cut their way through the northern plain and rejoin the Rhine, whence they would be colonised by the aqueous fauna of that river, including the burbot.

Geologists have learnt to be very cautious in forming conclusions founded upon the distribution of living fauna, which, of course, affords much less trustworthy evidence than that supplied by fossil remains. Birds and insects are so mobile, mammals so commonly subject to transport and acclimatisation by man, that

their presence in any particular region throws no sure light upon the remote geological past. Fishes, also, are both mobile and subject to transport by human agency. We have it on the authority of Linnæus that the puny stone-loach owes its presence in Swedish waters to Frederick I., who caused it to be introduced because he loved its delicate flavour. British trout fishers entertain anything but gratitude for the monks of old who so diligently carried the omnivorous pike from river to river and lake to lake with the view of an easy and abundant supply for fast days. With these facts before us it may seem that the present distribution of fishes has as little bearing upon geological problems as that of beasts and birds. In the case, however, for which I am asking consideration, it is not the presence of the burbot, but its absence from the Thames, which seems to have significance. That absence must be owing to some agency, and if it could be proved that ice was the agent, the theory of the mode in which the Thames was severed from the Rhine system would be made clearer.

The grayling is another Rhine fish which is conspicuous by its absence from the Thames and its tributaries, or was so until recently when, as I am informed, grayling were introduced to the head waters. It is probably impossible now to ascertain the original distribution of the grayling in British waters, so freely has it been transplanted by anglers and naturalised in streams where it was certainly not indigenous. This has been especially the case within the last fifty or sixty years. Grayling now swarm in the Tweed, the

Clyde, and many other Scottish waters where they were unknown before. Howbeit, despite the confusion arising from the artificial distribution of grayling, evidence is not wanting that this fish is truly indigenous only in that group of rivers which had connection with the Rhine in post-glacial times and which now contain the burbot. Mr. T. F. Pritt says in his *Book of the Grayling* (1888)—'With the exception of the Hodder, a tributary of the Ribble, and the Wenning, a tributary of the Lune, grayling are found in all the main rivers of Yorkshire and Derbyshire, and in most of their larger tributaries.' Now the Ribble and the Lune are the only rivers of Yorkshire and Derbyshire which flow to the west, except the Mersey which, rising in the extreme south-west of Yorkshire, has been polluted out of all semblance of a fish-producing stream. All the other waters of these counties flow into the catchment of the Ouse, the Trent, or the Don, and may therefore, like the burbot of these rivers, claim descent from a Rhenish ancestry. If, as is probable, grayling have ceased to exist in the rivers of the Fen district, their disappearance, like that of trout, may be attributed to the ravages of pike, which always attain a destructive ascendancy in sluggish waters. It can scarcely be a mere coincidence that both grayling and burbot should be absent from the Thames valley and abundant in the east-flowing rivers aforesaid.

Anglers commonly assume, I think without good reason, that the south-flowing Hampshire rivers have held grayling since immemorial time. 'There be many of these fishes,' wrote Izaak Walton, 'in the delicate

river Dove [a tributary of the Trent], and in the Trent, and some other smaller rivers, as that which runs by Salisbury [the Avon]'; but it is to be observed that he does not mention the grayling as inhabiting the Itchen, beside which he spent so much of his life. Probably there were none in that fair stream in Izaak's day. Trout fishers wish to goodness there were none now. That there were none in the Test previous to the nineteenth century seems clear from the following extract from the *Chronicles of the Houghton Fishing Club*, which I had the pleasure of editing in 1908:

'Origin of the Grayling in the Test.

'About the year 1816 Mr. Tate and Mr. Snow of Longstock sent Mr. John Haines their fisherman to Heron Court [on the Avon] to fetch 25 brace of grayling given to them by Lord Malmesbury. Haines brought the fish in a water-cart, and rested them in the miller's trunk at Romsey. One fish only died, and the survivors were put into the Test at Longstock. They were small; not more than 3 or 4 oz. each.

'The Longstock Fishery in a few years became well stocked with grayling; but, as the stock increased, they gradually quitted that part of the river for the water below, and it is now (1834) some years since any have been taken above the town of Stockbridge. At the present time, the place at which grayling most abound is Houghton Shallows and neighbourhood, about four miles below Longstock. . . . In consequence of a wish to increase the stock, no small grayling were killed until the year 1829; but in that year, when the numbers had increased, the members of the Club more frequently resorted to Stockbridge late in the year for the autumn fishing, killing grayling of 1 lb. weight without reserve, from which they had heretofore generally abstained.'

This note in the *Chronicle* was entered in 1834.

Referring to Izaak Walton's testimony to the presence of grayling in the Hampshire Avon, it is to be regretted that we have no information as to how they came to be in that river. It is highly improbable that they should be indigenous there, and absent from the Test and Itchen, streams of similar character flowing in courses parallel to the Avon and at no great distance from it.

September

XXXV

THERE may be—doubtless there are—forms of physical anguish more excruciating than a gumboil; but for sheer disabling misery there can be but few to beat it. I had writhed through the night, with such snatches of sleep as throbbing temples and burning jaw would allow me to take, when a relentless rapping on the door by a crepuscular housemaid made me aware that it was five o'clock. Could I face it? 'It' was a hasty toilet (shaving in the condition of my poor face was not to be thought of), such food by way of breakfast as I might swallow without mastication, and a ride of several miles on a hill pony (eight, if I recollect aright, but there were no milestones) to the place appointed overnight for me to meet the stalker. The pain and discomfort, methought, could not be greater in the open air than among the blankets; the late September daybreak wore its most winning aspect, so up I got, dressed for the hill, swallowed some porridge and a cup of coffee, and climbed into the saddle.

A Hard Day on the Hill

My route lay along part of the ancient bridle-path that winds its westward way from Kinloch Rannoch through the Black Corries, past the old bleak little

lodge of Corrour, 1500 feet above sea-level, wherein I was a guest, thence along the steep shore of Loch Ossian, down Strathgulvan, and so through Glen Spean to Lochaber, Fort William, and—commonplace. Of old this track was much in use by drovers, pedestrians, and pack-horse traffic; but since the West Highland Railway was opened it has become deserted, and so seldom does anybody pass that way that one involuntarily takes curious note of any traveller he may meet. On the day previous to that about which I am prosing, I happened to meet a pedestrian going west of so singular appearance as to cause me to wonder how in the world he had arrived in that desolate region, 1500 feet above sea-level. He was very tall and lean, had a large and extremely red nose, and, being clad entirely in black, irresistibly suggested the figure of Dominie Sampson.

Well, as my pony picked his way slowly along the rugged side of Loch Ossian, he suddenly shied so violently as well-nigh to pop me into the said loch. The object which shook his nerves was the individual I had seen the day before, who now lay fast asleep in a little hollow in the bank. Gathering up the reins, I followed the precedent set by priest and Levite in the parable, passing by on the other side, noting at the same time that under the sleeper's elbow lay a white book or bundle of papers. The sun had grown hot before I reached the trysting-place, and there remained still two or three miles to walk before reaching the foot of Beinn-a-chlachair, which was my beat for the day. This conical mountain—the Stonemason's Hill—rises

to a height of 3569 feet, and forms part of Ardverikie Forest. My host of Corrour had rented this beat for the season. Arriving at the foot of the ascent, I told Robert Mackintosh, the stalker, that I was very ill, and did not feel able to climb the hill, which is about the steepest ground in those parts. In fact, I was in such wretched pain that I would willingly have paid a five-pound note to be conveyed home without further exertion.

'Ah, well, that is not good,' said Mackintosh, in whose hands as a stranger sportsman I was but as clay in those of the potter. 'We will go up a piecey and spy about. There are some good beasts on the hill, whatever.'

So up we went, and up and up; till suddenly Mackintosh clapped low, beckoning the gillie and me to do the same. Something had moved a herd of about thirty deer which were coming pretty fast along the face of the hill above us. They had neither seen nor winded us, and if they held the course they were keeping, it seemed likely they would pass within range. The stalker slipped the rifle out of its case and passed it to me. A rocky bulge in the hillside to our right presently hid the deer from view; before us was a hollow—a shallow glen—across which they could not well pass without offering a fair chance. There were four or five stags among them, two of which the stalker pronounced good, shootable beasts.

We had not long to wait. A couple of hinds came first in view, very much on the alert. They paused a moment at the side of the glen, looking up and down

it, then cantered across, followed by the rest of the herd. 'There, take the black one,' whispered the expert at my side, and I loosed off at a dark stag as he crossed the open.

'You have missed him, sir,' he exclaimed hoarsely, as the beast disappeared behind an eminence on our left. 'Take that other! Now!!' and I gave this beast the other barrel; at least I meant to do so, but the stalker declared that it was another miss, that I had fired too high, for he saw the bullet strike the rock beyond the stag. In ordinary circumstances I should not only have been vexed with myself, but heartily ashamed, for they were both fair shots, not more than a hundred yards off; but I was in such pain as dominated every other sensation. Indeed, I felt relieved from the necessity for further exertion, having accomplished a stalk more easily than might well have been, and might go home at once. But before doing so I accompanied the stalker in a listless, perfunctory way as he went up to examine the ground where the deer had passed. It was well we did so; for there, behind the hillock on our left, lay both my stags stone-dead, shot through the heart! One was a royal, and the other was as good a beast, except that one antler was broken. Certainly, this was the best piece of luck that ever happened to me in a deer forest; indeed it is the only occasion that I can remember killing two stags right and left.

It was past noon before the double gralloch was accomplished, and blazing hot. Now for home! 'Would Sir Herbert not just come a bittie up till I get a spy down the Chimney? I would say there is sure to

be beasts on the faich below.' Passive clay and the inexorable potter again! There is no autocrat more compelling than a stalker on his beat. Up we went again; steeper and more stony grew the way, till at last we lay on the summit of this blessed mount, and Mackintosh was scanning the wide prospect with his glass.

It was a likely harbour for deer. A thousand feet below us lay a wide strath between our hill and Ben Alder; a stream wound, like a skein of silvery silk, through dark heather broken by streaks and patches of emerald pasture. I could detect no sign of life except an eagle circling over the flank of Ben Alder.

Mackintosh spied long in silence, and I nourished the hope that the strath was empty, and that I might be spared the ordeal of another stalk. A craven thought to own to in such a scene and under a soft September sky, but there it was. Howbeit, after a prolonged survey Mackintosh lowered his glass saying, 'There is a good beast yonder in a pretty good place.' He told me to turn my glass upon some dark peat hags, and there, sure enough, was a stag lodged, nearly as dark as the peat, for he had been rolling in the mire after the luxurious manner of his kind in fine weather.

So here I was in for another stalk—*noblesse oblige*—and all ignoble as I felt, there was *noblesse* enough in that distant animal, which might be another royal, to compel me to the task. Approach to him lay down the Chimney—a deep gutter or cleft, vertical in places, which led right down the face of the hill to the plain below. I must shorten this narrative, already too long,

and inelegantly egoist. We arrived at the foot of the hill, had a brief crawl through wet peat hags to within easy range of the stag, then a long wait among clouds of esurient midges till he chose to rise to his feet, a point-blank shot, and a heavy ten-pointer yielded his gallant spirit with hardly a struggle. It was now past five o'clock, and I was ten miles from home. Only one incident in the return journey remains for record. It was late gloaming—nearly dark—as I rode past the hollow in Leitir Dubh where I had left Dominie Sampson asleep in the morning. He was there no longer; but through the gloom I could see the glimmer of white paper. Weary as I was and in sore pain, I dismounted in curiosity to ascertain what was the literature he had been studying. It was a copy of *Anne of Geierstein.* 'Pro-di-gi-ous!'

XXXVI

A Hawk's Adventure

In a former volume of this series[1] I remarked upon the difficulty of defining Force except by certain technical terms intelligible only to experts, whereof I am not one. I used as an illustration of the effect of momentum—of the impact of a swiftly moving soft substance upon a stationary hard one—an instance which came under my own observation of a hen pheasant flying through a plate-glass window without receiving any injury. Strange to say I have since witnessed a similar performance by a bird of a very different character from the pheasant. This time it was a sparrow-hawk which, being disturbed by a passer-by

[1] *Memories of the Months*, third series, p. 41.

in feeding on a starling which it had just killed, rose and, carrying its booty with it, dashed through a window of the ante-room where we were sitting at tea and landed on the floor inside, still grasping its prey. The force expended in this case was less than that required for the passage of the pheasant, for, although the window broken by the hawk was only ten yards or so distant from that broken by the pheasant, the pane shattered was only sheet-glass, probably a hundred years old; whereas the pheasant encountered and overcame unhurt the far more substantial resistance of plate-glass. In this case, as in the other, the bird suffered no injury, and, notwithstanding the bad record against her (for she too was a female) and her kind, we liberated the fierce little pirate, and she flew away as strongly as if nothing had happened. Next morning I met her in the wood hard by, or, if it was not the same bird, it was one of the same species. I reckon it good luck that both these incidents happened in my own house and that I was present on both occasions.

The sparrow-hawk (*Accipiter nisus*) is a splendid sprinter, dashing with lightning speed into a flock of small birds, or swooping round the corner of a building upon a brood of young chickens. It meets with scant mercy from gamekeepers, by whom it is commonly known as the blue hawk, from the prevailing slaty hue of the plumage on its upper parts, whereby it may easily be distinguished on the wing from the harmless, mouse-hunting kestrel (*Falco tinnunculus*), whose attire is mainly of rich russet. Both birds, of course, go by the name of hawk, though the kestrel is a true

falcon, distinguished as such by its long pointed wings, the notch on the upper part of the beak, and the dark-brown iris, while the sparrow-hawk displays the insignia of its clan, namely, shorter rounded wings, a notchless beak, and a yellow iris.

XXXVII

Our Lady of the Nettles

Few natural phenomena defy forecast more successfully than the effect of seasonal temperature and rainfall upon certain forms of insect life. A hard winter is popularly believed to destroy a vast quantity of creeping and flying things in the larval and pupal stages; yet, for the life of me, I have never been able to connect cause and effect in this matter. The severest winter probably since the Crimean one of 1854-5 was that of 1894-5. Even on our mild western seaboard the mercury fell below zero Fahrenheit; and not only so, but the frost endured without intermission from the middle of January to the middle of March, so that the surface soil, with all its living contents, was frozen hard to a depth of many inches. What was the result? A surprising one to myself and many other honest anglers who were fully prepared for a dearth of ephemerid and other flies acceptable to trout, for the rivers were icebound for nine consecutive weeks. I was joint tenant of a fishing on the Itchen at that time, and seldom have I seen the rise of such flies so copious or so frequent as it was in the summer of 1896.

In like manner it is impossible to predict from the numbers of queen wasps in spring what may be the

quantity of the swarms in August. Queens were unusually numerous in the shining months of May 1912; that there was a singular scarcity of wasps in autumn may be set down to the cruelly cold and wet summer which followed; but similar causes do not always conduce to like results. Take, for instance, the appearances of certain *Lepidoptera*. The summer of 1908 was ideal, but in that autumn we missed the customary display of Red Admiral butterflies. Hardly one was to be seen. In 1909 there was a more abundant hatch of these fine insects than had occurred since 1901. I have it noted that on 15th September I set to work to count these brilliant creatures on the autumnal flower-beds. Seven of them were competing with bumble bees on one plant of *Sedum spectabile* (always a special favourite with honey-lovers). A few yards off five more Admirals were regaling themselves on the fragrant yellow heads of *Inula Hookeri*, while nine were busy among the long violet tassels of *Buddleia variabilis superba*. Twenty-one of these large flies within the space of a cricket pitch. How came they to be able to take advantage of the splendid harvest sunshine? Spring had been bitter and backward; severe May frosts had told with fatal effect upon much young growth, and from the middle of June till the end of August there was a constant succession of cold, sweeping rains, which hardly left a young partridge alive.

Well, after counting one-and-twenty Red Admirals, I gave up the reckoning. They were flitting in every direction, all apparently freshly freed from the chrysalis,

with glossy wings blazing with the colours so dear to all good Germans—sable, scarlet, and white—far smarter than their parents who awoke from their winter sleep at Whitsuntide and, in garments tattered and weather-wasted, set about laying upon the nettles those eggs which were to undergo such swift and wonderful metamorphosis.

In truth, if the Red Admiral were a rare insect we should make a fine fuss over it. Common though it happily is, it is a creature for which familiarity can never breed contempt, so thoroughly satisfying to the human eye is the just balance of intense scarlet and jetty black on the wings, so craftily are the snowy spots set just where the black is blackest. Then how masterly is the touch of azure at the edge of each hinder wing—just a touch and no more, for more would make the composition gaudy.

But why, it may be asked, call an admiral our Lady of the Nettles. Well, partly because the female of this butterfly is more conspicuous than the male, not in colouring, both sexes being of equal brilliancy, but because of her superior size. It seems, indeed, rather anomalous to confer upon her a rank for which, under existing regulations of His Majesty's Navy, females are not eligible. Secondly, because Linnæus's wayward fancy puzzles me in his choice of a scientific name for this butterfly—*Vanessa Atalanta*. Vanessa, I have always understood, was a pretty cryptonym borrowed by Dean Swift for Esther Vanhomrigh, when he replied to her proposal of marriage under the name of Cadenus—an effective disguise for the Latin title of

his office—*Decanus*. How came the serious Scandinavian to light upon the name of Vanessa for a butterfly? And Atalanta? True, the Red Admiral's flight is strong and fairly swift—for a butterfly; but not nearly so swift as that of *Vanessa Io*, the Peacock butterfly. The connection between Red Admirals and nettles is as indissoluble as that betweer human admirals and the ocean. If we could rid the land of nettles, as many of us have said in our haste we would fain do, there would be an end to our gay Red Admirals, for it is on that malignant herb that their caterpillars feed. So do those of the Peacock and Small Tortoise-shell butterflies; indeed, the last-named insect is scientifically known as *Vanessa urticæ*—Vanessa of the nettle. It is not a little remarkable that these three butterflies, which are more richly painted than most things that thrive under our petulant skies, should all be nurtured upon a plant that everybody detests.

The gorgeous Peacock butterfly is uncommon in Scotland, more's the pity; nor is it easy to account for this, seeing that the nettle is as irrepressible in that land as anywhere. Even more to be deplored is the total absence of that charming harbinger of spring, the Brimstone butterfly (*Gonepteryx rhamni*). It is no question of latitude or temperature that deprives Scotsmen of this lovely insect, for it is common further north in Norway. The reason for its absence is that the caterpillar feeds exclusively on the two species of buckthorn (*Rhamnus frangula* and *R. catharticus*), both of which are exceedingly rare, if indeed they are anywhere indigenous, in Scotland. One morning lately

in a Wiltshire garden I enjoyed a pretty sight—a Brimstone butterfly hovering long and lovingly over a plant of sulphur-coloured antirrhinum, the colour of the flowers exactly matching that of the insect's wings.

XXXVIII

A Rare Moth

On 7th September 1917 there was brought to me a fine specimen of one of the largest, rarest, and most beautiful of British moths—the convolvulus hawk-moth (*Sphinx convolvuli*), a noble insect measuring nearly two inches and a half from between its enormous black eyes to the tip of its coquettish grey tail, and four inches from tip to tip of its expanded wings. It was the first time I had seen or heard of the occurrence of this fine insect in Scotland; but, as it turned out, that season will be long remembered by entomologists for the appearance of convolvulus hawks in considerable numbers in many parts of England and Scotland, as far north as Inverness-shire. One of our housemaids was greatly perturbed on finding one in the porch, for the moth's great size and its prominent eyes give it a somewhat sinister appearance to the uninitiated.

Like most large moths, the convolvulus hawk keeps its wings closed when at rest, and its long antennæ, resembling slender slips of rubber, are laid back close along the furry thorax. In this posture the creature enjoys the advantage of perfect protective colouring, the upper portion of the thorax and the fore-wings being marbled with ashen-grey, light brown and black,

exactly matching the bark of a tree or a stone overgrown with lichen. But when the moth expands its wings there is a flash of livelier hues. On its back, just at the junction of thorax and abdomen, are two bright bosses; the stout cone-shaped abdomen is of bright rose colour, crossed by six transverse bands of black and white. The proboscis is a remarkable organ, longer when uncurled than the entire insect from head to tail. It is kept closely coiled under the head until its owner poises after the manner of the hawk-moths before some large flower, such as a petunia, tobacco plant, or gladiolus, when it shoots it forth to suck honey. It darts quickly from plant to plant; but is not shy of being approached when hovering with humming wings while it extracts the sweets.

It has been generally believed that this moth seldom or never breeds in the United Kingdom, and that those which appear in this country from time to time are immigrants from the Continent.[1] If that be so, one would expect them to be somewhat travel-stained, whereas those that I have seen were glossy and fresh.

Probably it breeds with us more frequently than is supposed; for the caterpillar, though measuring five inches in length when full grown, proportionately stout and conspicuously coloured, may easily escape detection, owing to its habit of living underground during daylight and issuing forth only at night to feed—mainly on convolvulus leaves. It varies in colour from apple-green to dark brown (I write this

[1] The years most notable for the appearance of convolvulus hawks in Britain have been 1846, 1856, 1859, 1875, 1887 and 1917.

only from the description by others, never having seen the larva), always bearing on each side seven sloping slashes, which are sometimes yellow, sometimes green or purple. It carries, of course, the badge distinguishing the larvæ of this genus, namely, a curving horn on the upper surface of the last segment of the body. The function of this peculiar feature has never been ascertained. In the present species the horn is coloured yellow with a black tip.

October

XXXIX

THERE is one rule to which, although it has escaped the observation of many persons who feel a warm general interest in animated nature, there is no exception. That rule enacts that no insect can add to its stature once it has passed the stage of larva (grub, maggot, or caterpillar) and has become a pupa (chrysalis or cocoon).

Gossamer

'But,' one may hear an incredulous person argue, 'is not the common house-fly an insect?'

'Undoubtedly. It has a segmented body, six legs and breathes through tracheæ or air-tubes instead of lungs.'

'Very well,' persists the sceptic; 'look at that window. Are there not house-flies of three or four different sizes on the panes?'

'Certainly; but the smaller flies are not the young of the larger ones. I see on that window flies of three or four different species, though I am not doctor enough to distinguish them by name. They bear a strong resemblance to each other; but you may rely on it that all the individuals of the same species and sex are of the standard dimensions assigned to that species,

and that they have neither grown nor shrunk since they left the cocoon and became perfect insects. This applies to every species of insect—to the gorgeous Malayan butterfly *Ornithoptera*, measuring seven inches across its expanded wings, as well as to the minutest midge that ever caused you to use impious verbs and adjectives.'

'How about spiders?' demands the critic. 'I am certain I have seen young broods of small spiders.'

'Nothing more likely; but spiders are not insects. They are arachnids, an intermediate between insects and crustaceans. A spider is more nearly akin to a crab than to a cockroach. It is true that spiders have segmented bodies; but they have eight legs instead of an insect's six, and they do not pass through the metamorphoses imposed upon insects.'

Spiders are responsible for the phenomenon of 'gossamer'—those myriad threads of extreme tenuity which float through the air in incalculable numbers on calm autumn mornings and form a glistening mist on miles of grass and other herbage. Gossamer has been attributed by some naturalists to the agency of the spinning mites, *Tetranychinæ*, of which perhaps the most easily recognised is the so-called red spider, *T. telarius*. Fortunately this mischievous little creature does not abound in anything approaching the swarms necessary to produce the phenomenon in question, which has now been ascertained to be the work of true spiders, the young brood being wafted about and dispersed by means of the threads which they eject from their 'prentice spinnerets. Dr. A. E.

Shipley has described the process with his customary lucidity:

'Only a small portion of gossamer flakes are found to contain spiders, though minute insects are constantly to be seen entangled in them. They are not formed in the air, as was supposed long after their true origin was known; but the threads emitted by multitudes of spiders in their various spinning operations have been intermingled and carried away by light currents of air, and on a still warm day in spring or autumn, when the newly-hatched spider-broods swarm, the atmosphere is often full of them.'[1]

The problem of gossamer was sifted to a solution by John Blackwall.[2] He proved by experiment that the little spiders required the assistance of a gentle current of air to send out the thread from their spinnerets:

'Having procured a small branched twig, I fixed it upright in an earthen vessel containing water, its base being immersed in the liquid, and upon it I placed several of the spiders that produce gossamer. Whenever the insects[3] thus circumstanced were exposed to a current of air, either naturally or artificially produced, they directly turned the thorax towards the quarter whence it came, even when it was so slight as scarcely to be perceptible, and elevating the abdomen, they emitted from their spinners a small portion of glutinous matter, which was instantly carried out in a line consisting of four finer ones, with a velocity equal or nearly so to that with which the air moved. The spiders, in the next place, carefully ascertained whether their lines had become firmly attached to any object by pulling at them

[1] *Cambridge Natural History*, vol. iv. p. 342.

[2] Died in 1881; author of *History of the Spiders of Great Britain and Ireland*, 1861-4.

[3] A slip. Spiders are not insects.

with their first pair of legs. If the result was satisfactory, after tightening the line sufficiently, they made it fast to the twig; then discharging from their spinners, which they applied to the spot where they stood, a little more of their liquid gum, and committing themselves to these bridges of their own construction, they passed over in safety, drawing a second line after them as a security in case the first should give way, and so effected their escape. Such being invariably the result when spiders were placed where the air was liable to be sensibly agitated, I resolved to put a bell-glass over them, and in this situation they remained seventeen days, evidently unable to produce a single line by which they could quit the branch they occupied, without encountering the water at its base; though on the removal of the glass they regained their liberty with as much celerity as in the instances already recorded. This experiment, which, from want of due precaution in its management, has misled so many distinguished naturalists, I have tried with several of the geometric spiders, and always with the same success. Placed under the bell-glass, or in any closed vessel, they in vain endeavoured to make their escape; but in the disturbed air of an inhabited room they readily accomplished their object.'

The innumerable threads thus emitted by swarms of young spiders readily rise in the air, as Professor Miall has pointed out, in the same way that 'fine dust rises in moving air and fine sediment in moving water.'[1] It is by this means that the dispersal of young spiders is effected, without which the places where they are hatched would become congested and the food supply would soon give out.

Spiders are hatched from eggs in full possession of their limbs, and, unlike insects, grow in bulk till they

[1] *Round the Year*, p. 244.

reach the standard size of their species. By that time they have developed certain faculties of amazing variety and complexity. A large book might be filled —nay, have not many volumes been filled already?— with descriptions of the constructive ingenuity and deadly ferocity of different species of spider. After studying these creatures, it is hard to decide which feeling is uppermost, admiration for the engineering skill and patient precision displayed by some species in web-weaving, or horror at the ruthless ferocity of the domestic life of other species. They are not to be blamed for their career of rapine; creatures of prey, they are so constructed as to be unable to exist except by devouring weaker creatures. Man, at all events, who takes delight in laying big game low, tearing 'rocketers' out of the sky and palming off patent foods upon calves while he appropriates the delicious beverage destined for them by nature—Man, I say, is hardly an appropriate critic of the spider's predatory habits. Rather should he sympathise with it as a bold and skilful hunter. We fear, but we do not hold in abhorrence, the lion and the tiger; why, then, do the spider's habits fill us with disgust? Not because it stabs its victim with a pair of poisoned daggers. The late J. H. Fabre has shown that this is in truth a merciful mode of despatch. He proved by repeated experiments that the deadly *Lycosa*—the tarantula of Southern Europe—never stabs its prey till it can fix its fangs in the nape of the insect's neck. A wound in that vital part drives the venom direct into the cervical ganglia, causing instant paralysis and painless death.

Does not such deft surgery compare favourably with a human butcher's pole-axe?

No, it is not in satisfying its legitimate hunger that *Lycosa* and many other species of spider sicken us. It is the sordid treachery of the nuptial chamber that one cannot contemplate without disgust. I have described elsewhere the daily butchery that I have witnessed in the web of one species.[1] It seems that what would be loathed as unnatural in the higher animals is part of the nature of most, if not all, kinds of spider.

Spiders are divided roughly into two groups, Web-spinners and Hunters, corresponding to the Retiarii or netsmen, and the Samnites or shield-and-swordsmen of the Roman gladiatorial arena. Web-spinning spiders, like the Retiarii, trust to entangling their victim in a net before delivering the mortal thrust. The hunter spider spins no web, but trusts, like the Samnite, to agility and a keen weapon. But in both these groups the female, always larger, stronger, and more nimble than the male, exhibits an abominable appetite. I have described elsewhere the domestic economy of one of the *Epeiridæ*[1] which I kept under observation for some days. It was not a whit worse than that of the race in general. The female spider is polyandrous, that is, there is no limit to the number of males which she admits—nay, entices—to her embrace. Upon each one, after he has satisfied his passion, this ghoulish creature turns her poisoned fangs. A single snap, and the hapless bridegroom is—I was about to say 'no

[1] *Memories of the Months*, third series, p. 240.

more'; it is more correct to express it otherwise. He becomes a corpse, of which the horrible bride makes a hearty meal, and forthwith applies herself to attracting another mate, who will be received with the customary blandishments, and, having served his term, will be disposed of in like manner as his predecessors. The foul drama loses none of its horror from the fact that the murderess possesses four pair of eyes.

XL

The evolution of articulate speech was one of the chief enigmas that confronted Charles Darwin in formulating his doctrine of the descent of Man.

Can the Lower Animals Converse?

'It is a remarkable fact,' he says, 'that an ape, one of the Gibbons, produces an exact octave of musical sounds, ascending and descending the scale by half tones, so that this monkey alone of brute mammals may be said to sing. From this fact, and from the analogy of other animals, I have been led to infer that the progenitors of man probably uttered musical tones before they had acquired the power of articulate speech.'

He proceeds to illustrate his proposition by the peculiarities of sound uttered by infant man, and from the cries of certain mammals and birds; but, if I read his discourse aright, he maintains throughout a fixed distinction between articulate speech and inarticulate vocal sound. One cannot but regret that he did not live to welcome the invention of the gramophone, which, by stereotyping sound, so to speak, would have

been of incalculable aid in his researches on this subject.[1]

Articulate speech consists of vocal or vowel sound[2] divided by joints (*articuli*) into syllables. These 'joints' we term consonants. 'They are not musical vibrations as vowels are, but noises accompanying them.'[3] The voices of beasts and birds are not articulate, because no beast or bird can sound any consonant except various gutturals. Their vocal utterances are divided, not by joints (*articuli*), but by pauses—'rests' as they are termed in music. In literature dogs are made to say 'bow-wow,' but the most learned dog that ever barked could never pronounce the labial consonant *b* any more than a cat could sound the initial consonant of the conventional 'miaouw.' And so with all the other lower animals. The nearest approach that any of them can make to consonantal sound is the hiss of a snake or of a blue-tit disturbed on her nest. But in imitating either of these creatures one does not make the sound between the tip of the tongue and the teeth, as is necessary for a true sibilant, but between the thick part of the tongue and the palate.

Are we to believe, therefore, that beasts and birds are unable to communicate to each other any intelli-

[1] Several years ago a statement went the round of the newspapers that a certain French naturalist was on the point of starting on travel in Africa, taking with him a gramophone, with which he proposed to record the speech of baboons and monkeys. I have not come across any report of the result.

[2] 'Vocal' and 'vowel' are of common Latin origin; the first formed direct from the Latin *vocalis*, the second transmitted through the French *voyelle*, both ultimately offsprings of *vox*.

[3] Tylor's *Primitive Culture*, vol. i. p. 169 (third ed., 1891).

gence except the primitive emotions of fear, anger, amativeness, and so on? Man's heritage of flexible lips, an arched palate, and an even palisade of teeth enables him to modulate his vocal sounds with far more delicacy and significance than our sense of hearing enables us to detect in the cries of beast and bird. His vocal equipment is adequate for the expression of his meaning, which expression no doubt exceeds that of a dog in range, variety, and complexity in proportion to his higher intelligence. But one need not go the length of the French cynic in declaring: 'Plus je vois les hommes, plus j'admire les chiens,' and yet credit a dog with being able to communicate vocally to his own kind his considerable range of intelligence.[1] To describe a dog as one of the 'dumb animals,' denying that the sounds it utters have any specific meaning for other dogs, seems as unphilosophic as when the Greeks of old classed all foreigners as *βάρβαροι*—barbarians—that is 'babblers.'

One is apt to forget that human speech consists of a great deal more than the mere sounding of vowels and consonants. Stress and pitch are indispensable in conversation; in their absence, misunderstanding or uncertainty is inevitable. Dr. Tylor has illustrated the importance of stress—that is, emphasis or accent—as affecting the sense of any sentence. He takes a simple phrase: 'I never sold you that horse,' and shows how the whole meaning may be altered according to the

[1] It was another Frenchman, Alphonse Karr I think, who thanked Heaven that his dog could not speak, because he felt sure that the animal would bore him to distraction by repeating the same thing over and over again.

emphasis laid on any one of these six words. We can form no estimate of the degree in which the 'dumb animals' use emphasis in vocal communication with their kind.

Pitch—musical pitch—is even more subtle than emphasis; it is equally significant, but not so easy to define. To do so, I must quote again from Sir Edward Tylor:

'Europeans, while using modulation of musical pitch as affecting the force of words in a sentence, know nothing of making it alter the dictionary meaning of a word. But this device is known elsewhere, especially in south-east Asia, where rises and falls of tone, to some extent like those which serve us in conveying emphasis, question and answer, etc., actually give different signification. Thus in Siamese, *hā*=to seek, *hã̄*=pestilence, *hà*=five. The consequence is that . . . to sing a Siamese song to a European tune makes the meaning of the syllables alter according to their rise and fall in pitch, and turns their sense into the wildest nonsense.'[1]

Now one cannot listen to the voices of beasts and birds without detecting constant modulation of pitch, and it must be assumed that there is, besides, much modulation whereof our hearing is not sensible. In discussing the vocal means of communication possessed by the lower animals (including insects) we should bear in mind the limitations of our sense of hearing. Even the normal human auditory chamber receives no impression from sound-waves that may affect the hearing of other animals. I have in mind a young man whose hearing was, and is, perfect for all practical purposes, but who has never been able to hear the cry of a

[1] *Primitive Culture*, vol. i. p. 169.

partridge or the chirp of a cicala. Some persons have naturally what is termed 'an ear for music'; in others the response to musical notes is less developed. The degree of perception depends upon the sensitiveness of an apparatus of extraordinary complexity situated within the cochlea of the ear. This apparatus, known as the organs of Corti (being named after Count Corti, who discovered it), consists, roughly speaking, of between three and four thousand tense fibres, ranged in serried rows, and bent so as to form bows or arches. This apparatus is susceptible of training to a very high degree of delicate perception. Weber calculated that a sensitive ear may be educated so as to be capable of distinguishing the difference of $\frac{1}{64}$th of a tone; giving nearly four thousand distinct sounds, corresponding pretty closely, perhaps precisely, with the number of arched fibres in the organs of Corti. But these fibres, according to Helmholtz, do not respond to any note outside the seven octaves comprised in human music. Nobody who has given any thought to the problem would be so rash as to maintain that the hearing apparatus of every kind of animal is attuned to the same range of vibrations and its sense of hearing subject to the same limitations as that of man. To take examples from low down in the scale of animals, the hearing organs of Medusæ or jellyfish and lobsters must be attuned to a vastly different kind of sound from those of terrestrial creatures. We cannot even imagine what class of sound can take place under the sea, though one can understand that it is important for such vulnerable creatures to be able to recognise the

footfall of a carnivorous crab or the approach of a shoal of mackerel.

It seems, then, wise for us to hesitate before pronouncing any animal to be mute simply because we cannot hear it utter any sound. Zoophytes and crustaceans have been proved to possess hearing organs; it does not follow that, inhabiting a different medium from ours, they can perceive the sounds whereof we are conscious; but some sounds, though inaudible to us, they must of a certainty perceive, and possibly have the power of communicating audibly with each other, although we cannot hear them.

Some such train of thought passed through my mind as I sat lately one calm autumn morning beside a sequestered inlet of the sea and listened to the cries of several hundred seagulls busily feeding among drifts of seaware cast up by the equinoctial gales. They were chiefly the blackheaded gull (*Larus ridibundus*), which parts with its black, or rather chocolate, head at this season, and the common gull (*Larus canus*). It was an unceasing babel of sound, in which methought I could recognise the expression of content, irritation, inquiry, and other emotions. To my ear it seemed inarticulate; yet not one whit more so than the noise of a human crowd. Many and many a time it has occurred to me when ascending the stairs at a London evening party or standing in the fishmarket of Lisbon that the jangle of voices conveyed no more intelligence to a listener outside the crowd than does the cawing of a rookery, the bleating of a flock of sheep, or the clangour of Homer's wild geese on reedy

Simois. Yet the confused sound aforesaid was made up by a multitude of articulate sentences, more or less grammatical and charged with meaning of some sort. Was it safe to assume that the seagulls before me were uttering sounds devoid of meaning?

Hitherto I had lain ensconced among the rocks. The birds had no suspicion of my presence. I rose to my feet and showed myself. Instantly the whole huge assembly fell silent; not another note was heard as the birds took wing and flew off to sea. Though I could not interpret their voices, their sudden silence was easy to understand. Their impulse was to get away as quietly as they could from what they regarded as danger. If one recognises the significance of their abstaining from uttering sound, can one safely pronounce the sounds to be meaningless when uttered?

One cannot demonstrate the undemonstrable; but I incline strongly to the belief that animals which we pronounce incapable of articulate speech, are nevertheless accustomed to exchange vocal information, however limited in range, among themselves. Further, that fishes and other creatures which utter no sounds audible by man, may communicate with each other by sounds which take effect upon the hearing apparatus of their own kind. It may well be that their vocabulary is extremely limited, possibly, like Irish Home Rule in its early days, to three F's—food, funk, and friendship; but that they have and use a vocabulary I cannot find it in my understanding to doubt.

XLI

Spare the Song-birds

It must be accounted one of the minor evils of war that, for the first time in my recollection, song-birds such as mavis, merle, and the like have been offered for sale this year (1917) by poulterers in some of our Scottish towns. No doubt strict rationing and the high price of butcher meat will be pled as excuse; and good must be the excuse to justify such a departure from the habits of our people. But is the stringency indeed so great as to bring us into competition with cats and rats and sparrow-hawks in seeking what we may devour? In France, Italy, and a few other continental countries, small birds of all kinds, especially blackbirds and thrushes, are relentlessly killed and eaten during the spring and autumn migrations; but the British Isles have hitherto proved a safe asylum for those that escape destruction. Many years ago I spent my Easter holidays geologising and botanising in Auvergne and Champagne. We had three weeks of balmy April skies; never did that delectable region put on a more enchanting aspect; the Grand Sarcoui was spangled with pasque flowers in violet and gold; the wayside copse was all embroidered with tender green. In England at such a season and in such winsome weather the land would be ringing with bird song from dawn till 'dimsey.'[1] Far different here! No gladsome carol of lark on the open down, no mellow note of merle in the green wood; only the mocking jeer of magpies and the confident chortle of

[1] A Devonshire synonym for gloaming or twilight.

the green woodpecker; for these even the French peasant wife, culinary adept as she usually is, avails not to render palatable. During those three weeks we were almost constantly in the open air; yet in all our walks and drives I saw but one song-thrush, and *that* had a broken wing; and I never saw a blackbird.

In another part of these random notes[1] I have recorded the result of the conference which, at the instance of the French Government, was held in Paris in 1895 to devise international co-operation for the protection of birds useful to agriculture. A protocol was then agreed to binding the States represented (I think all European governments sent delegates, except Turkey, Bulgaria, and Montenegro) to certain protective measures. The British Government, which the late Mr. Howard Saunders and myself had the honour of representing, declined to conform to these measures, which had been anticipated by our own more stringent Wild Birds Protection Acts, and further regulations were uncalled for in a country where small birds are not killed for food. The Italian Government, also, stood out from the agreement, not, as her Minister explained, in the opinion that protective measures were not urgently required in the interest of agriculture, but because the traffic in small birds is so universal in Italy, the trade of bird-catching so long established, and the numbers consumed as food so enormous, that any attempt to suppress the practice would create a revolution.

We had a foretaste in the summer of 1917 of what

[1] *Memories of the Months*, fifth series, pp. 213-18.

our farmers and gardeners would have to face if small birds were indiscriminately slaughtered in this country, which is their immemorial asylum in Western Europe. The stock was severely depleted by the severe winter of 1916-17; thousands of peewits and soft-billed birds perished of starvation, grubs, chrysalids, and insects on which they rely for provender being sealed up in the frozen ground for nearly three months without losing their vitality. There is no commoner or more mistaken belief than that a hard winter destroys insect life. It serves merely to protect them from their feathered foes. When the long frost came to an end at the end of March they issued forth in swarms, and there were few birds to reduce their numbers. The *Journal of the Board of Agriculture* for August 1917 supplies abundant evidence of the mischief wrought in parts of England. Here, for instance, is a passage in the report of Mr. J. Snell, one of the Board's inspectors:

'The caterpillars of the antler moth (*Charœas graminis*) swarmed in June on practically all the hill pasture from Derbyshire to Westmorland, migrating at the rate of eighteen inches to two feet a minute. In the pools of one small stream they were lying in masses from six to nine inches deep. These were decaying, and the stench was very noticeable. In fact, all the small streams intersecting the invaded pastures were covered with a green slime due to the decay of large numbers of drowned caterpillars. . . . The damage to upland grass was very severe: bare, brown hillsides were characteristic features in the infested parts.'

Mr. A. C. Cole of the Board of Agriculture and Dr. A. D. Imms of Manchester University report to the same effect from the Peak district, and add:

'As regards the control of this caterpillar, the value accruing from the presence of rooks and starlings cannot be over-estimated. . . . The scarcity of the lapwing is a further factor in connection with the existing plague.'[1]

So much for birds as friends of the farmer; but is there not also some regard due to those songsters which enliven woodland and garden with their song? Pleasure, as well as business, is an economic factor in rural lives, and a good deal of it would be missing if we converted all our feathered songsters into ragouts as the Italian peasantry do use. 'Mere sentiment,' do I hear some reader murmur? 'Well enough for "the idle rich," but men and women hard working for a livelihood, take no notice of what tickles the ear agreeably but does nothing to stock the larder.' Do they not? I happen to have cut the following paragraph from the *Pall Mall Gazette* so long ago as 11th May 1889—

'An extraordinary scene is to be witnessed every evening at Leicester in the freemans' allotment gardens, where a nightingale has established itself. This midnight songster was first heard a week ago, and every evening hundreds of people line the roads near the trees where the bird has its haunt. The crowds patiently wait till the music begins, and the bulk of the listeners wait till midnight, while a number of enthusiasts linger till one or two o'clock in the morning. Strange to say, the bird usually sings in a large thornbush just over the mouth of the tunnel of the Midland main line; it is heedless of noise and smoke and steam, the stream of song being uninterrupted for four or five hours every night.

[1] The *Journal* for the following month—September 1918—contains a paper on the food of certain wild birds, by Dr. Walter Collinge, who is well known for his patient and systematic research into this branch of economic ornithology. His paper is well worthy of attention by all persons engaged in agriculture and horticulture.

So large has been the throng of listeners that the chief constable has drafted a number of policemen to maintain order and prevent damage.'

Cinema theatres had not been invented when this paragraph was printed; but even now, when they appear to be numbered among the necessaries of every neighbourhood, methinks—

'The nightingale, full-toned in middle May'

might still hold an audience of Leicester artisans spellbound.

A friend, writing to me from London his experience of German air-raids on two successive nights, described how he and all his household spent the hours of darkness in the basement of his suburban villa, adding: 'After the roar of guns for hours in the dark, the blackbirds were singing at dawn as bravely as ever. What jolly boys they are!'

As I plead the cause of the song-birds, there comes to mind a certain occasion when I happened at dinner to sit next a very high dignitary of the Church of England. It was in pre-war days of affluence and gourmandise, when hosts and *chefs* were wont to conspire in presenting a menu of exorbitant length and variety. A lark pudding was handed round, which I passed with silent protest against the barbarity. Howbeit, the prelate by my side helped himself liberally to it. I ventured to express surprise that he should partake of such a dish. 'Why not?' quoth he, 'it's very good.' Whereupon I said bluntly that it was almost as dire an outrage as Nero's *entrée* of nightingales' tongues.

'Well,' he replied, 'I suppose if I did not eat it somebody else would!'

It occurred to me that similar excuse has often been made to serve palliation of more grievous offences. Kaiser Wilhelm II. has declared that if his armies had not seized and occupied Belgium, the French were prepared to do so.

XLII

Among birds reckoned as inhabiting the British Isles (less than four hundred species), perhaps none is so popularly known and easily recognised as Robin-Redbreast, and none is less generally suspected of the migratory habit. Nevertheless, in common with every other British song-bird (one may hardly class that confirmed stay-at-home, the house-sparrow, as a song-bird), vast numbers of robins arrive on our shores and depart from them seasonally. No doubt many robins are permanent residents, just as a percentage (much smaller than is commonly known) of blackbirds and thrushes haunt the same lawns and shrubberies throughout their lives; but these are exceptions to the rule which constrains the bulk of the feathered population of the northern temperate zone to shift quarters twice a year. Almost the only birds which do not conform to this rule are the house-sparrow aforesaid, and gallinaceous fowls such as grouse, ptarmigan, pheasants, partridges, etc. Lapwings, for instance, may be seen in all parts of England and southern Scotland during every month in the year; none the less it is certain that the whole body of

Migration of the Robin

them move northward in spring and southward in autumn. Those flocks which feed upon the fallows and marshes of Kent at Christmastide, may nest in Sutherland and Caithness, where there are no lapwings, in winter; and the plovers' eggs collected in Surrey and Hampshire must be laid by birds which wintered in southern Europe.

But to return to the robins. It has been thoroughly well proved by the personal observation of skilled ornithologists at different lighthouses, as well as by the reports of lighthousemen trained to observation, that very large flocks of robins, both of the British and Continental races, do migrate seasonally. By this is meant not a mere temporary shift of quarters during cold spells in winter, but a regular regional movement to and from the breeding haunts.

There is no more desolate spot in the United Kingdom than the Flannan Isles or Seven Hunters, far to westward of the northernmost Hebrides. A lighthouse was built on the largest of them, Eilean-mor, in 1899; and in the autumn of 1904 Mr. Eagle Clarke and Mr. T. G. Laidlaw spent sixteen days in observation on that precipitous rock. They reported the passage of small companies of robins in spring and autumn; while a few individuals of this species appear there from time to time throughout the winter. The same has been noted in St. Kilda, which stands miles to the west of the Seven Hunters, one should suppose on the road to nowhere. How these little travellers, with whose powers of flight we are best acquainted as they flit from bush to bush in our gardens, are directed across tracts

of stormy ocean to such desolate fragments of *terra firma*, is one of the mysteries of animal intelligence.

In Sule Skerry, which lies well in the track of migration to and from Iceland and Scandinavia, being only thirty-five miles north-west of Hoy Head in Orkney, Mr. Eagle Clarke could only obtain records of robins appearing in autumn on their southward flight. Let me commend to all who take an interest in the subject Mr. Clarke's *Studies in Bird Migration* (1912) as an admirable counterpart to Herr Gätke's well-known *Heligoland* (1895); for Mr. Clarke has had the advantage of serious scientific training, which Herr Gätke had not. Heligoland, unhappily, is a regular charnel-house for birds, the inhabitants regarding the seasonal arrival of the flights as designed by Providence for the replenishment of their larders and pockets; whereas Mr. Clarke sets an example which it is to be wished could be enforced upon ornithologists. He is content to register having seen a bird without thinking it necessary to put it to death in order to confirm his observation.

Very different appears to be the practice of Professor C. J. Patten, who communicated a sanguinary paper to the *Zoologist* (January 1913) describing the migration of robins as observed at the Tuskar Lighthouse off the coast of Wexford. He seems to be afraid that nobody will take his word as having identified even so familiar a bird as the robin unless he can produce its corpse, or, as he euphemistically phrases it, unless he has 'collected it.' Referring to four occurrences of the robin at the Tuskar Light, as reported by Mr. Barrington,

Dr. Patten remarks: 'The birds were not captured, and so these occurrences cannot carry the same weight that they would had the specimens been secured and forwarded for corroboration.' Cannot they? Are we then to dismiss as untrustworthy Mr. Eagle Clarke's statement that on 10th November 1888 fifty or sixty robins were at the lantern of the Kentish Knock Lightship from 2 A.M. till daylight, when they were allowed to resume their journey unmolested? It is impossible for any ordinary lover of nature not to be moved to indignation by Dr. Patten's cold-blooded procedure. Here is an example supplied by himself:

'On Thursday night, September 12, 1912, at 10·10 o'clock, a robin came slowly up to the lantern, and, as it fluttered down the glass, I collected it. . . . Two days later, on September 14, 1912, I observed a robin on the rock at 9·30 A.M. It was tame, rather fatigued, and easily collected. . . . Two nights later, September 16, 1912, at 11·15 P.M., I collected a robin which came in quietly and fluttered down the lantern. Just then chiff-chaffs appeared in considerable numbers, and I collected specimens of them immediately before and after I secured the robin.'

What a tale of blood! I submit respectfully that this sort of work brings science into disrepute. It has been the cause of several persons—the present writer included—resigning membership of the British Ornithological Union, a body which has done so much excellent work in the past, but which does little or nothing to stay the ruthless hand of the collector. Why, instead of 'collecting' his victims, could not Dr. Patten be content to release them, after ascertaining

whether they belonged to the insular or continental type? He might even have offered some chopped bacon to the travel-worn, hungry little wayfarer that he found so 'tame' on the rock. Nobody, one should think, can have witnessed the daylight migration of small birds across the ocean without some promptings of compassion. Their weary little wings just serve to carry them clear of the waves. When one of them makes a resting-place of a passing ship, as so often happens, instantly it buries its head in the scapular feathers and goes fast asleep.

There is work, no doubt, for collectors, seeing that museums must be maintained; but for heaven's sake let it be understood that, in the case of familiar species, we shall be quite satisfied with the reports of competent observers, without calling upon them to produce the corpses which they have collected.

We are no nearer understanding now what agency guides the birds in migration than we were when the late Professor Newton asked us to attribute it to 'inherited, but unconscious, experience'; a somewhat vague explanation which does not diminish our perplexity on learning from Herr Gätke that *young* starlings are invariably the first migrants to arrive at Heligoland in summer. It is easier to divine the cause of old cuckoos being the next to arrive; for it may be supposed that they leave our shores so soon as the summer flush of caterpillars becomes stinted. They leave their offspring (which probably they have never seen and would not acknowledge if they had) to follow six weeks later.

XLIII

Pheasants

A certain noble lord, now no more, owner of wide tracts of upland and lowland well stocked with game, bore the reputation of a fastidious *gourmet*. Note, please, that this term denotes something very different from *gourmand*, which bears a significance of gluttony, whereas *gourmet* denotes one with a fine, educated taste in solids and liquids. We used to smile covertly at some of what we reckoned his lordship's fads. For example, though he was at pains to provide plenty of shooting for his friends, and though hecatombs of pheasants fell to their guns in the home coverts, he never would allow one of these hand-reared birds to be served at his table; those only which were shot on the skirts of moorland or flanks of the mountain possessing the flavour to please his refined palate. The experience of the years of war, happily numbered with the past, has sufficed to convince one that Lord ——'s judgment was just. It has been matter of general note that, since hand-feeding of pheasants has been suspended and the birds left to pick up a living in the woods and fields, not only is their flesh of far superior flavour, but its texture is much more delicate. No doubt this is partly owing to the wild birds subsisting to a large extent on insect and other forms of animal life, and it goes to confirm the opinion which many of us, besides Lord ——, had formed, namely, that Indian corn, the staple food of hand-reared birds, renders the flesh hard and dry, and turns the pearly fat into an unpalatable yellow adipose like

vaseline. Personally, I never used to eat pheasant when there was a fair alternative; now, I ask for no more delicate food. It is devoutly to be hoped in the interests of true sport that pheasant rearing will never be resumed on the grossly exaggerated scale which it had assumed before the war. Covert shooting had degenerated to the ignoble level of competitive marksmanship, retaining no trace of scientific woodcraft except in the head keeper who marshalled the beaters, and the shooters might have as well displayed their skill and exerted the moderate energy required of them in blazing at glass balls. But no fair objections can be taken to the stock of wild birds being supplemented, were it only with regard to the food supply, by a reasonable number of pheasants reared at the coops. In any case, where recourse is had to winter feeding in order to keep the birds in the woods, it is highly desirable that some substitute be found for Indian corn.

Mr. William Beebe's sumptuous *Monograph of the Pheasants*, recently published by Witherby and Co. in four volumes elephant folio, comes to remind one of the splendour displayed in the plumage of the male in every species of the true pheasants and their allies, and the extravagant contrast which it presents to the sober attire of the hen birds.[1] It looks as if polygamy had something to do with this. Gallinaceous birds that pair, like the grouse and the partridge, exhibit but slight difference in the plumage of the sexes; whereas among black-game, capercailzie, and pheasants, the hens are discreetly arrayed in protective colouring.

[1] Mr. Beebe has not lived to see his fine work published. He met a soldier's death in France.

In the capercailzie the contrast is enhanced by such a disproportion in size that the cock might be mistaken for a separate species by one not acquainted with the birds. The average weight of three cock capercailzie as recorded in the Royal Scottish Museum is 8½ lb., the extreme length being 3 feet 4 inches, while two hens weighed respectively 4¼ lb. and 4 lb., with a length of 2 feet 2 inches. Our domestic fowls have undergone infinite manipulation at the hands of unnumbered generations of men of many races; but neither the industry of poultry breeders nor the vagaries of the show pens have prevailed to impair the majesty of Chanticleer or assimilate his plumage to the modest garb of his harem. It seems, on the contrary, that the tendency has been to make it more conspicuous, for the male red jungle fowl (*Gallus ferrugineus*), the species in which all the domestic strains are believed to have their origin, does not flaunt his tail feathers in the defiant manner of the barnyard bird, but carries them drooping in obsequious fashion.

Agreeable emotion thrilled the members of the British Ornithological Club when, at one of their periodical dinners a few years ago, a traveller exhibited a single tail feather of a pheasant picked up in the island of Formosa. The bird itself had not been seen by any European. The feather evidently belonged to a cock bird; it was long and slender, jetty black, barred with narrow white lines. Mr. Walter (now Lord) Rothschild forthwith despatched an expedition to Formosa, whereof the result was shown at a subsequent dinner of the B.O.U. in the shape of skins of both sexes

of this new pheasant. Experts recognised in them features justifying the bird being classed in a distinct genus under the name *Calophasis Mikado*. The colour scheme of the male resembles that of the blackcock—sooty black, lit up by metallic gleams on neck and breast, and relieved by a flaming patch of bare, scarlet skin over the eye. Altogether the cock bird, far from gaudily attired, gives one the impression of a scrupulously well-dressed and well-groomed gentleman of elegant figure. Indeed, while contemplating a pen of these birds which Mr. H. J. Elwes has at Colesborne, I could not but think that 'the Shopwalker' would have been a more appropriate title than 'Mikado.' His mate has to content herself with the protective drab plumage so characteristic of females of the *Phasianidæ*.

The colour schemes of the male birds of this order are as varied as they are daring and fantastic. Hardly could one devise more startling contrast with the sombre austerity of the aforesaid Mikado than is presented in the lavish splendour of the golden pheasant, which, by the by, is only a pheasant by courtesy, modern ornithologists having placed him in a separate genus under the name of *Thaumalea picta*—the Painted Wonder-bird.[1] But that does not concern us here; if he is not a true pheasant, he is next door to it, although no amount of compulsory education will train him to be a decent rocketer. It used to be thought that golden pheasants required the pro-

[1] Under a recent revision of classification the title of the genus comprising the Golden and the Amherst pheasant has been altered to *Chrysolophus*, which, meaning 'gold-crested,' is appropriate enough, but less musical than the old name.

tection of an aviary in our climate[1]; but in fact they may be naturalised in British woodland as easily as the common ring-necked and Colchic species. Most delightful objects they are in a landscape, especially about the garden, the cock bird having but one fault—inveterate self-consciousness. He seems to be as painfully aware of being over-dressed as one might feel if overtaken by daylight in walking back from a fancy-dress ball. His one impulse seems to be to run away and get hidden out of sight. Except in spring. Then you may study him to your heart's content, as I did one evening lately, strutting about on a sunlit lawn, surrounded by his dusky harem in mute admiration of his glittering raiment.

And what raiment it is! on a par with the kingfisher's, Nature's freak of illumination, just to show dwellers in the temperate zone what she can do when she lets herself go in the tropics. A flame-coloured crest, an erectile orange ruff barred with sable, a bottle-green jacket turned up with yellow and scarlet, a crimson vest, and a long, arching chocolate tail—such is the everyday wear of a private gentleman in Thaumalean society. Who so dull as not to covet such a gay denizen of his shrubbery? Anybody who chooses may have it. Some twenty years ago the President of the Zoological Society turned down a lot of exotic creatures on a shooting which he rents in the south-west of Scotland—among others, some golden pheasants. These, breeding

[1] So recent an authority as the late Professor Newton described them in his admirable *Dictionary of Birds* as 'only fitted for the aviary.'

freely, leaked into the coverts of his neighbours, where they were not universally welcome, owing to the erroneous belief entertained by most gamekeepers that they are pugnacious and disturb the common pheasants. Hearing that one gentleman had ordered the golden pheasants in his woods to be destroyed as vermin, I begged for a few of them, chiefly, I confess, with a view to the furnishing of salmon flies. These birds, having been released in our own woods, have made themselves perfectly at home, and have so greatly propagated their kind that their progeny have to be kept in check by shooting a few from time to time. I have never seen them on the table, though they are reported to be very good food; but the carcase is ridiculously small under the prodigal finery that envelopes it—hardly as big as a partridge's and the reverse of plump.

More chaste in colouring than the plumage of the golden pheasant and no less charming is that of the Amherst pheasant (*Thaumalea* or *Chrysolophus Amherstiæ*), so named after Countess Amherst, wife of the Governor-General of Bengal (1822-28). But alas! the two species must not be liberated on the same ground; not because they disagree with each other; on the contrary, they consort only too well, making up their harems indiscriminately from each other's offspring. The resulting hybrids are fertile and almost invariably inferior in beauty to both the pure races.

November

XLIV

Beavers

WITHIN an easy morning stroll of Folkestone there is a peculiar little dell or combe where a deep cleft has been driven through the chalk breast by a stream, once considerable in volume, but now reduced to a mere trickle, partly subterranean. Advantage has been taken of the flat floor of this dell to create a charming garden. Steep wooded banks afford perfect shelter against winds from every quarter, thereby enabling many things to flourish that would succumb to the buffeting of an English winter. But what strikes one as most remarkable in the collection is the character of the plants. They consist largely of rare Indian rhododendrons and other members of the Heath family which cannot be grown in chalky soil. To find such things luxuriating in the heart of the South Downs is indeed a surprise to any gardener or amateur.

The mystery is dispelled when the guardian of this pleasaunce draws attention to the soil. It is peat—pure black peat—as he proves by thrusting a bamboo six feet down into it. Next, the problem presents itself—how comes there a flat mass of deep peat on a chalk

down? The clue to that must be sought by visualising (shade of Samuel Johnson, forgive thy disciple for allowing that unlawful, but convenient, participle to escape from his pen!)—by visualising, I say, the land-surface as it was two or three thousand years ago; for although beavers survived in Great Britain to much more recent times (their skins were still being exported in the middle of the twelfth century), they must have been killed out in Kent long before they disappeared from Wales and Yorkshire.[1] This flat floor of the glen seems to have been the work of beavers—a 'beaver lea'—such as is commemorated in the name of Beverley in Yorkshire and the Beverley Brook that flows between Wimbledon Common and Kingston Hill. In the remote past these animals may have thrown a dam across the stream which originally carved this cleft in the chalk, and the peat has accumulated in the still water round their deserted dwellings. Had the surrounding beds been sand, gravel, or alluvial soil, the pond would soon have been silted up; but chalk streams run clear, allowing ample time for the growth of peat. No doubt there are many features in the landscape of our island owing their character to beavers, the most powerful of rodent animals; but it is seldom that local geology lends itself to preserving a 'beaver lea' so distinctly as in this dell.

Mr. Radclyffe Dugmore is the author of a most

[1] It is remarkable that, although abundant fossil and semi-fossil remains of the beaver have been found in almost all parts of Great Britain, there is no evidence, organic or literary, that they ever existed in Ireland.

interesting monograph of the North American beaver,[1] an animal which is distinguished scientifically from the European species only by a slight difference in the bones of the head. He calls his book *The Romance of the Beaver*, which is doing it scant justice, for it is a thoroughly workmanlike study of the nature and habits of a creature about which much that is mythical and unsound has been written. Mr. Dugmore's purpose has been, first, 'to provide a book free from exaggeration and not too technical; secondly, to call attention to the question of protecting the most interesting animal to-day extant.' To this end he spent many seasons studying beavers in and about their homes. He is the first naturalist to succeed in photographing these most elusive animals in a wild state.

'In all my experience,' says he, 'of hunting with the camera, no animals have ever given me so much trouble. The best pictures I have obtained of lions and other big and dangerous beasts were secured with far less difficulty than even the worst of my beaver studies. . . . The surest way is, of course, by flashlight, and the surest place is at the dam. A small break in the structure will be almost certain to induce the beaver to come to repair it, as they don't like to let the water escape. . . . If all goes well, you will get lots of exposures, but in most cases the pictures will show simply a shapeless mass of wet fur. Such, at least, has been my experience, for out of about thirty exposures only four or five showed the animal with any shape.'

Few creatures equal, none excels, the beaver in the strength, foresight, and engineering skill applied to

[1] *The Romance of the Beaver, being the History of the Beaver in the Western Hemisphere*, by A. Radclyffe Dugmore. (London, Heinemann.)

the construction of its dwelling. In these qualities the European species is fully equal to the American. To build an effective dam a man must be a bit of an engineer, using his head quite as much as his hands. One of Mr. Dugmore's photographs shows a beaver dam 365 feet long and, for the greater part of its length, seven feet high. Felling forest trees is a heavy job; risky too, for any but skilled woodmen. Another photograph shows a birch tree fifteen feet in circumference felled by the beaver's chisel-like teeth. The late Lord Bute established a colony of beavers in a wood through which runs a stream in the island of Bute. Though I have waited long and vigilantly in view of the dam they had constructed, I never had the luck to catch sight of one of its architects, but I saw plenty of stumps whence they had cut the trunks for their building.

Within the dam, says Mr. Dugmore, the lodges of the community are built, and whereas the entrance to each lodge is under water, it follows that each member of a family in returning home brings in a lot of wet with him. That has been provided for. The wet runs through the floor of the apartment, on one side of which the bed of grass or wood-shavings is raised on a kind of dais, whereon, we may presume, the careful housewife allows none of the party to recline in a wet jacket.

After all, the ways of these beasts are so weird as to justify the title Mr. Dugmore has given his book. The most matter-of-fact account of them savours of romance. Although this author indulges not in fine writing, his

plain narrative is more stimulating reading than most works of fiction, and enlists all our sympathy with his efforts to obtain protection for a fascinating but rapidly dwindling race of creatures.

'In former times, when the Indians had the almost exclusive trapping, they were systematic in their work, and the number taken from each colony was seldom in excess of what would keep the numbers fairly stationary. When the white man entered the competition his one idea was to secure the largest possible crop of skins, utterly regardless whether or not he killed the goose that laid the golden egg. . . . At one time it was quite a question whether the beaver was not on the very verge of extermination. The passing of protective laws and the making of parks or reserves have, we hope, rendered this fear groundless, and the beaver that has done so much in the past to help in the development of Canada, will find sanctuary in the land of its forefathers.

Amen, with all our heart! I was glad, when last I was in the Natural History Museum at Dresden, to be assured by its accomplished Director that the European beaver still lingers in the Elbe, where it is strictly preserved. It survives also in the Rhone, the Rhine, the lower Danube, and in two or three places in Norway, receiving protection by law in most, if not all, of these regions. Probably, though of this we have no record, it is not yet extinct in Russia, but its food—the inner bark of trees—and its habit of inundating wide tracts of low ground, are not of a nature to earn the goodwill of foresters and farmers.

XLV

Antlers

In the summer of 1913 a remarkable exhibition was organised by *Country Life*, arranged by Messrs. Rowland Ward, and displayed in the gallery of the Royal Water-Colour Society, Pall Mall, consisting entirely of the heads and antlers of red and fallow deer. It was a chance not to be missed by any one interested in British natural history, for such a representative collection had never before been got together, nor is it likely that so fair an opportunity will recur of comparing the extremes of dimension in the antlers of red deer—the fantastic exuberance developed by sheltered quarters and abundant food, as in the head of the great Warnham stag with its thirty-nine points—the baneful effect of severe exposure, as shown in the horns from Loch Maddy and Corrour Forest—the noble development of antlers in British red stags acclimatised in the rich pasture and genial sunshine of New Zealand.

To the owners of Scottish deer forests the exhibition was not devoid of melancholy, for it showed how the Highland heads have deteriorated within the last hundred years. Except in rare instances where a temporary effect has been produced by the introduction of fresh blood from English parks or continental mountains, it would be impossible at the present day to match such heads as the ten-pointer from Kinlochewe,

shot in 1814,[1] or the grand seventeen-pointer from Gordon Castle, shot in Glenfiddich in 1831.[2]

'It is curious,' observes Mr. Walter Winans in his treatise on *Deer-breeding for Fine Heads*,[3] 'that Scottish stags are at the present time the worst in Europe.' It would be strange if they were not, having regard to the conditions of climate, exposure, and food with which they have to contend. The real wonder is that they have not degenerated still further from the magnificent animals that once roamed the Caledonian forest — that fine type which, as shown by the size of bones and horns exhumed from peat-mosses and estuaries in Scotland, was once no whit inferior to the red deer which now inhabit the Caucasus, the Carpathians, Asia Minor, and, it may be added, certain English parks. Originally and constitutionally the red deer was a woodland dweller, resorting, no doubt, to high bare ground in the heat of summer to escape the torment of flies, and to browse on the fine flush of upland grass, but ever relying upon the forest—the true forest—for shelter, warmth, and food in winter. Man stripped the land of trees, expelling the deer from plain and valley, and confining them to storm-swept wastes at high altitudes. It is through a grim kind of irony that the term 'deer forest' has come to connote

[1] It is doubtful whether the Kinlochewe horns, with their extraordinary width of spread, stand now as they did on the stag's head when living. Probably, if the piece of skin covering the junction were removed, it would be found that the horns had been sawn off the skull and reset at a wider angle.

[2] This splendid stag weighed 37 stone 7 lb. as he fell on 21st September. The length on outside curve of each antler is forty inches.

[3] London, Rowland Ward, 1913.

some of the bleakest, most treeless tracks in northern Britain. Of the true forest nothing remains but a few —very few—shreds and patches; the finest of which, that dark mantle of noble pines along the south shore of Loch Arkaig, has been consigned to the timber merchant within the last few years.[1]

It would be folly now to search the deer ground of Sutherland and Caithness for a head approaching in grandeur to one preserved in the Museum at Dunrobin. This was found in the Halladale River in 1869. 'The circumference of the beam above the bay point is extraordinary, no less than nine inches, greater, in fact, than any modern wapiti. The horns are not long (thirty-six inches), but very massive, and carry twenty-six points.'[2]

Not far from my own home in Galloway the river Cree winds for about eight miles in a tidal estuary before it reaches Wigtown Bay. The deep alluvium through which it has cut a devious course contains the ruins of the primeval forest—huge stems of oak, which, unlike the usual black timber from the bogs,

[1] In 1788 Alexander, 4th Duke of Gordon, sold a great breadth of the pine forest of Glenmore to an English merchant, who took eighteen years to fell it. The logs were floated down the Spey, and built at Speymouth into forty-seven ships of an aggregate burthen of 19,000 tons. When Mr. Osborne, the purchaser of the timber, finished his work in 1806, he sent a memorial plank to the Duke, which now stands in the entrance hall at Gordon Castle. It measures 5 feet 5 inches wide at the butt end, and 4 feet 4 inches at the top, and is of a rich dark brown colour. In 1912 the top of this magnificent tree was still lying where it was cut off more than a hundred years ago, on the hill above Glenmore Lodge, 1400 feet above the sea, and was still hard and sound. It measured three feet in diameter—nine feet in circumference—where it was cut off.

[2] *Mammals of Great Britain and Ireland*, vol. iii. p. 95.

retain a beautiful yellow or fawn colour. Before Austrian supplies had practically ousted British oak from the market, it was well worth considerable labour to recover such of these ancient trees as became partially exposed through the action of the tides. Simple means were adopted to extract them from the mud. Empty barrels were attached to a log at low tide; when the tide rose the barrels rose also, slowly but surely drawing the tree from the place where it had lain for, perhaps, thousands of years. It was a common thing that during this operation the remains of immense red deer were brought to light, relics of the herds which no longer roam over the southern upland.[1]

Two horns recovered in this manner are before me as I write. They are not a pair; one is a live horn with part of the skull attached; it measures 37 inches along the outer curve, and $7\frac{1}{4}$ inches in circumference between brow and bay, and has seven points. The other is a cast horn with six points remaining, the brow tine having been broken off. It is 38 inches long, and $7\frac{1}{2}$ inches round the horn between brow and

[1] According to local tradition the last wild red stag killed in the Galloway Hills fell to the minister of Kirkinner towards the close of the eighteenth century. After the 9th Earl of Galloway acquired the lands of Cumloden in 1827, he enclosed a wide tract of hill and dale, and stocked it with red and fallow deer. In the good shelter of this chace, the stags bear horns which would put average modern Highland heads to shame. In a deer drive at Cumloden I was ensconced under a stone dyke in company with a fair lady. I saw about half a mile off a very large stag making straight for my lair, and told my companion of it. She rose to look over the wall; a large blue bow in her headgear flapped in the wind; my stag promptly altered his course, and fell to a neighbouring rifle. His head was an imperial—fourteen points.

bay. The bay tine is of the extraordinary length of 20¾ inches.

So long as Scottish red deer exist in their present environment, exposed in winter to long periods of slashing wet and violent winds—conditions far more trying to these animals than severe dry cold—so long must they remain but stunted representatives of their kind. Moreover, expulsion of the deer from the low ground and the destruction of the forest (using that term to denote extensive natural woodland) has deprived them of much of their food supply. Except in so far as hand-feeding mitigates the suffering of the herds in hard weather, their existence is one of summer glut and winter famine. 'Most of the deer tribe,' says Mr. Winans, 'are fond of eating leaves; and if a branch falls or is blown down, all the deer in the park seem to know of it at once, and come galloping up from all directions to feed on the leaves.'

Those who have experienced the rigours of a Highland spring at even moderate altitudes will have noted that May is well-nigh spent before there is any appreciable growth of grass in the deer ground, and will have realised to what hardship the poor animals are exposed as the result of exclusion from their natural winter quarters. This circumstance alone would account for the deterioration of Highland red deer; nor can I share Mr. Winans' faith in regenerating them by crossing the native race with allied species such as the wapiti of North America and the Altai deer, which is the Asiatic form of wapiti, so long, I mean, as the native race remains under the present conditions of exposure

and shortage of winter food. Mr. Winans has achieved satisfactory results by his experiments with crossing deer in his park at Surrenden in Kent; but the winter conditions in 'the Garden of England' are not comparable with the alternation of arctic cold and pitiless wet that prevails for at least half the year in such elevated forests as Corrour, Ardverikie, and Rannoch. In the eastern Highlands, indeed, where the rainfall is not so excessive, the wapiti strain might have a favourable influence for a time; but this cannot be expected to be permanent, for the wapiti is much less patient of wet than our native red deer; even in sheltered parks it is very liable to consumption and wasting.

So much for the conditions of climate and nutrition with which Scottish red deer have to contend, and in which it would be unreasonable to expect any improvement; but, as if the adversities were not injurious enough to the quality of the stock, the mischief is greatly aggravated by the reckless mismanagement prevailing in most Scottish forests. On the Continent (I write of things as they were before the Great War) scrupulous care is shown to improve the race; but in our Highlands the finest stags are picked out by the stalker without a thought for the future quality of the herd.

'How often,' says Mr. Winans, 'one hears a stalker say, "Do not shoot that stag; he has a bad head"; or, "We had better go on; there is no head worth shooting in this lot." Whereas he ought to say, "There is a stag with a very bad head; you had better shoot him." What would be thought

of a breeder of horses and cattle who killed every good animal he bred, and only kept the trash? And yet this is just the way most Scottish forests are managed.'

Unluckily, it would be almost as practicable to alter the climatic conditions of the Highlands as to establish a rational and provident system of deer-stalking. Very few owners of forests are able to keep them for their own sport; the great majority of forests are hired by strangers who have no permanent interest in them, and naturally wish to carry away as many good heads as possible in token of their prowess. *Emulation* is a fair element in all field sports—is, indeed, inseparable from the spirit of them—but so soon as it is allowed to degenerate into *competition*, the blight of record-breaking sets in, prevailing over sportsmanlike forbearance alike in stalkers and in those put under their guidance on the hill.

At the present time of writing the conditions affecting ownership alike of deer forests and deer parks have been profoundly affected by the Great War. The paramount interest of food supply has been brought home to us more urgently than ever before in the history of the United Kingdom, and every other interest must yield to the necessity of turning land to the best account. First, as to deer forests: it is doubtful whether much of the land now cleared for deer is capable of producing more meat from sheep or cattle than it might be made to do under deer. There is no more nourishing and palatable flesh than that of red hinds and fallow does in winter, or of stags and bucks in summer, yet it is practically unsaleable. It is difficult to account for

the indifference, amounting in many cases to prejudice, of the non-sporting public in regard to venison, once esteemed *par excellence* the dish to set before a king. But kings in the olden time thought more of bodies than heads; they did not wait for the velvet to be off the horn, nor put off killing the stags till the approach of the rutting made their flesh rank and unsavoury. Thus it was in the month of June 1530, that young James v. of Scotland rode up Yarrow with a great company of hunters into Meggatdale and there, according to Pitscottie, slew eighteen score of harts with the velvet thick and tender on their young horns, besides all manner of small game taken with hawks.

But King James was out after nobler game than red deer and moorfowl on that occasion; and, if the memorial tablet at Carlenrig be not a slander on his honour, he treated some of his own subjects in a manner less sportsmanlike than he did the summer stags on Meggat Water. The young king (he was just eighteen) had set out with the purpose of suppressing the bandit clans on the Border and in the Debateable Land. He took the prudent preliminary course of arresting and committing to ward those powerful personages to whom he was entitled to look for maintaining order in those districts, namely, the Wardens of the East, Middle, and West Marches, the Lords Home, Bothwell, and Maxwell, together with several other barons, who, says Sir James Balfour, had 'winked at the willanies' of the Armstrongs and their like. The tradition runs strong that the King, on entering Teviotdale, promised a free pardon to all broken men who would come in to

his peace. There is not a shred of documentary or other evidence in support of this, which is just the sort of story that would gain currency and credence in a district where half the inhabitants were moss troopers and half of the rest were in league with them; but, be it true or not, it furnishes the darkest shade in the ballad of *Johnnie Armstrong*, whom, with some forty of his men, King James caused to be hanged on the trees round Carlenrig Chapel, after they had ridden in on the faith of the proclamation to receive the royal pardon.

But I have been tempted into an unpardonable digression. Let us get back to my text.

Even if the prejudice against venison as food were overcome, it would still be reckoned an offence against the community that deer have to be fed in the forest in hard weather. So, for that matter, must sheep and cattle be supplied with fodder if they are to survive the winter on the kind of ground now given up to deer; but sheep and cattle are free from the taint of being kept for the sport of rich men.

Considerations of a different kind affect the keeping of deer in parks. I have in mind a lovely dale in Westmorland, part of which was fenced as a chace under licence from Edward III. in the fourteenth century. For six hundred years, therefore, it has been a deer park, traversed by a salmon river, by the side of which runs a right-of-way, greatly appreciated by lovers of fair landscape. The strict political economist may denounce such a scene as an eyesore—the wasteful appanage of a manor-house—the lounging

ground of a selfish landowner. He would demand that the ancestral oaks which enrich the vale should all be felled, and the land ploughed to provide food for the people. It is true that the owner might derive a good profit by adopting this course. The pasture in this park is very poor, as often is the case where deer have long been the only stock; much of it is overshadowed by splendid trees, and more of it overrun by worthless bracken. The sale of the timber when felled would cover the cost of reclaiming, ploughing, fencing, and building, and the rent obtained from a farmer be a permanent addition to income from the estate. No doubt the economist is right: the land, at present, is not put to the best commercial use. At the present time (1918), when maritime warfare has rendered our food imports precarious, and the price of corn and meat has mounted beyond the experience of this generation and the foregoing one, it behoves all men to cast about for means to increase the home production. But it is well to look back as well as forward before precipitate action is taken. It is not very long since the price of corn had fallen so low as to throw many farms derelict. Unless some guarantee be obtained against cultivators being exposed to heavy loss through fluctuating markets, no prudent man will invest capital in turning old pasture into arable. After all, man doth not live by bread alone; there is a real, as well as a sentimental, value in beautiful scenery; the mind stands in as constant need of refreshment as the body does of nutrition. It may be expedient to curtail the park landscapes which are the glory of the English counties; but it is

wise to hesitate before condemning them wholesale, and irreparably destroying them.

Here, again, I am wandering away from the question of improving the stock of deer, and increasing their importance as food for men. Much may be done by good management and careful selection of breeders. Hitherto, none of that skill and forethought that has rendered British cattle and sheep the finest in the world had been bestowed upon deer until Mr. Winans applied himself to the task many years ago. He has set forth in the volume above quoted the results attained, and the means by which they were attained. Too often—as a rule, in fact—park deer are kept on the same pasture for generations, even for centuries, without any attempt to maintain or improve the quality of the grass, which is allowed to become harsh and poor. Mr. Winans lays much stress upon the advantage of fencing off portions of the park in rotation, to be top-dressed and rested for a year or more before the deer are allowed on again. The herd should always be provided with rock salt to lick, which greatly improves their condition,[1] and to all deer, especially red deer, water in the shape of a stream or pools is a primary requisite, and the more mud and marsh the better, to roll in when flies are troublesome.

Fallow deer run into more varieties than red deer; he who takes intelligent pride in his herd will aim at having it of a uniform type, whether that be the bay, the spotted, the black, the grey, or any other

[1] To how few owners of live-stock does it occur to provide this wholesome luxury in their stables and byres.

strain. This cannot be achieved under fifteen years. Mr. Winans prescribes that, in eliminating whatever varieties are not desired, a start should be made by killing off the bucks of those varieties. Thus, if a spotted herd is the object (and that variety is the most typical and ornamental), dark bucks and those indistinctly spotted should be shot. In a large park this may take two or three seasons to accomplish; after which elimination of the does should begin, all dark-coloured fawns being killed meanwhile. A herd of fallow deer which has been treated in this discriminating manner is far more attractive than a motley crowd of various colours, suggestive of domestic cattle. There is, however, no objection to one white buck in a spotted herd, for his influence will tend to increase the spottiness.

Red deer in parks are capable of improvement to an indefinite extent, both in heads and bodies, by judicious management. Mr. Winans has effected much in this direction by crossing the native race with wapiti and Altai deer. Personally, I have a strong aversion for crossing species; but as the union of these races produces fertile offspring, these cannot be reckoned as hybrids or mongrels, but the joint progeny of geographical varieties of a single species of as honourable parentage as the child of an English father and a Celtic mother. Mr. Winans speaks very highly of the offspring of a wapiti stag and a red hind crossed again with an Altai stag. They are more grey in the coat than pure red deer, but they weigh half as much again, and the stags carry horns that can hardly be distinguished from such as one may see in old German

and Austrian castles. Here, then, we have a distinct advance in the value of deer as flesh producers. It remains only needful to overcome the prejudice against venison, which is as irrational as the universal prejudice against eels among the people of Scotland.[1] Probably this could be overcome if one of the fashionable hotels —the Ritz for instance—were to make a *spécialité* of venison, consummately cooked, and of the choicest quality.

I cannot dismiss this prose about antlers without reflecting upon the prodigious waste of material involved in the annual shedding of these ornamental, offensive, and defensive appendages in solid-horned animals. One is tempted to exclaim with the disciples of Christ—'To what purpose is this waste?' Why should a pair of cored horns serve throughout the lifetime of a buffalo or an antelope, and the far heavier headgear of a wapiti or red stag be laboriously and painfully produced every summer, only to be thrown off in the following spring? A pair of antlers of a red stag taken from the ooze in Wigtown Bay weigh exactly 18 lb. One can understand the relief experienced by the animal in ridding himself of such a strain upon the muscles and tendons of his neck;

[1] Eels were at one time an important article in the Scottish peasants' diet. Camden describes in his *Britannia* (1586) the incredible quantity of most savoury eels—*incredibilem anguillarum sapidissimarum multitudinem*—which were taken by the people of Galloway in baskets in autumn. One hundred years later Andrew Symson, minister of Kirkinner, states in his *Large Description of Galloway* (1684) that great quantities of eels were caught about Martinmas, salted in barrels, and eaten in winter 'roasted upon the coals.' At the present day it would be difficult to find a Galloway man, woman, or child that would eat an eel, knowing what it was.

perhaps if he were given the choice he would remain a 'hummel'[1] for the rest of his career. But *noblesse oblige*; and by the time the hunter's moon is at the full he will be as proudly attired as ever.

XLVI

Animal Intelligence

Many capable brains have been baffled in the attempt to define the frontier line between instinct and reason, and far, very far, am I from claiming to contribute fresh material towards a settlement; yet the enigma has such chronic attraction for all who give sympathetic attention to animated nature, and the phenomena of animal behaviour are so engaging, that I venture to pass some comment on such evidence as has been collected, and to speculate on the direction in which scientific opinion seems to be trending.

The problem has resolved itself into three main branches:—

1. Are animals, other than man, born, and do they continue through life unconscious automata?
2. If they are conscious, are their consciousness and intelligence the physical product of certain chemical and organic changes taking place in the growth of the egg, embryo, or young creature, and therefore spontaneous in the sense that muscle, bone, and blood develop by the spontaneous multiplication of cells?
3. Is the conscious intelligence exoteric? In other

[1] The technical term for a hornless stag.

words, is it the consequence of an external and superior mandate or suggestion, acting upon a suitable physical receptacle?

1. *Are animals born, and do they remain, unconscious automata?*

Nobody who has systematically watched the behaviour of the young of birds and other animals is likely long to entertain the belief that, even if they are hatched or born as unconscious automata, they continue so for more than a very brief period—that they are, as it were, delicate and ingenious pieces of clockwork, performing with regularity those functions for which they are designed and adapted, so long as they are regularly wound up, *i.e.* fed. Experience, whereof the effects are manifest in every animal sufficiently highly organised for man to interpret its behaviour, and which may exist in the grades of life so low as to baffle human scrutiny—experience, I say, and instruction, whereof very few, if any, vertebrate animals are insusceptible,[1] are undoubtedly agents upon animal behaviour predicating a mental process such as could be implanted in no mere machine. To take a very homely illustration: no amount of repeated battering will prevent a humming-top bumping itself against furniture and other obstacles when it is set spinning; but one recognises the effect of experience upon the conduct of animals so low in the scale of life that it is

[1] It is a popular belief that guinea-pigs are not susceptible of instruction, and evince no recognition of one human being as more familiar than another. Probably this is no more than sheer assertion, founded on the phlegmatic behaviour of the animal in captivity, and not put to the test of experiment.

difficult to believe that any sentient creature can be totally devoid of conscious volition.

In 1873 Dr. Möbius reported to the Society of Natural Science for Schleswig-Holstein some observations by Herr Amtsberg of Stralsund on the behaviour of a large pike. Being confined in an aquarium this fish wrought such havoc among other fish in the same tank that Herr Amtsberg caused it to be separated from them by a sheet of plate-glass. Thereafter, every time the pike made a dash at one of its neighbours, it received a severe blow on the nose. The predatory instinct was so strong that it took three months to convince the pike that every attempt upon the life of these small fish resulted in pain to itself. Thereafter it let them alone, even when, after six months, the glass partition was removed. Experience had taught it that these particular fish could not be attacked with impunity, whereupon its intelligence came into play to control its predatory instinct, although, when new fish were put into the tank, it went for them at once.

Animals higher in the scale than pike, which rank low in the class of fishes, show more precocity in profiting by experience, even when deprived of the advantage of parental example and guidance. To some chicks reared in an incubator Mr. Lloyd Morgan threw caterpillars of the cinnabar moth. These larvæ are conspicuously marked with yellow and black rings, and have a flavour most distasteful to birds. The inexperienced chicks seized them greedily, but dropped them at once, wiping their bills in disgust, and seldom could be induced to touch them a second time. Next

day brown loopers and green cabbage-moth caterpillars were put before the little birds.

'These were approached with some suspicion, but presently one chick ran off with a looper and was followed by others, one of which stole and ate it. In a few minutes all the caterpillars were cleared off. Later in the day they were given some more of these edible caterpillars, which were eaten freely; and then some cinnabar larvæ. One chick ran, but checked himself, and, without touching the caterpillar, wiped his bill—a memory of the nasty taste being apparently suggested by association at the sight of the yellow-and-black caterpillar. Another seized one, and dropped it at once. A third subsequently approached a cinnabar as it crawled along, gave the danger note, and ran off.'[1]

Now in these instances the superior precocity in turning experience to advantage shown by very young chickens over Herr Amtsberg's pike may be accounted for, not only by the greater mental capacity of the higher vertebrate, but by the keener physical sense of the warm-blooded animal.

Instances like these might be cited in abundance to discredit the hypothesis that fishes and birds are unconscious automata. More perplexing are those displays of effective consciousness and caution which, if founded on experience, indicate that experience must have been congenitally transmitted.

I went a-fishing one day in the Mimram, a pretty little chalk-stream in Hertfordshire. From a little fishing-house on the bank I noticed several trout rising in a reach of the stream meandering through a

[1] *Habit and Instinct*, by C. Lloyd Morgan, p. 41.

meadow below. I made ready to approach them with all the craft I could muster. There happened to be three or four cart-horse colts careering about in the meadow, thundering along the water-edge close to the rising trout, which showed not the slightest alarm or intention of desisting from the capture of ephemeridæ. My host's keeper, solicitous for my comfort, sent a tiny maiden of some seven or eight summers to drive away the colts. This she did effectively, but her appearance on the bank made every trout quit the surface and flee for shelter. In fisherman's parlance she had 'put them down.' Now these trout, of mature age, no doubt had acquired enough experience to fight shy of an angler and all his works, and, though fearless of cart-horses, would be apt to scuttle off at the first gleam of his rod. But how came they to recognise this child as an immature specimen of *Homo sapiens*? Neither anglers nor poachers are in the habit of plying their calling in pinafore and petticoats. She can scarcely have been an unfamiliar apparition to the trout, for her father's house was close at hand, and she must have played many times upon that flowery marge. If the trout recognised her, they could not associate her with any experience of hurt or harm. On the other hand, it is still more difficult to account for their recognising this child as belonging to a hostile species, and the cart-horses to a harmless one, through intelligence imparted by or inherited from other fish. One cannot assign limits to the measure of warning and instruction which animals can convey to the young that they rear; but trout undertake no parental cares. They shed their

ova in the shallows and, long before these are hatched into sentient creatures, the parents have dropped back into the deeper waters, and if ever they meet their own offspring in after-life, are very apt to regard them as legitimate food.

It was written of old: 'The fear of you and the dread of you shall be upon every beast of the earth, and upon every fowl of the air; and upon all that moveth upon the earth, and upon all the fishes of the sea'; and this, in truth, has come to pass. Nevertheless, judging from Mr. Lloyd Morgan's observations of the chicks of domestic fowls, wild ducks, pheasants, partridges, moorhens, and plovers reared in an incubator, the dread of man, as such, is neither innate nor congenital. Neither does it precede man into parts of the earth whither he has not previously penetrated: witness the confidence, sadly misplaced as a rule, shown in him by penguins and other birds in polar regions, until they get to know him better.

In weak species the instinct of concealment appears to be inborn and congenital, for Mr. W. H. Hudson has recorded that, when he had the egg of a jacana (*Parra jacana*) in the palm of his hand, 'all at once the cracked shell parted, and at the same moment the young bird leaped from my hand and fell into the water. . . . I soon saw that my assistance was not required, for, immediately on dropping into the water, it . . . swam rapidly to a small mound, and, escaping from the water, concealed itself in the grass, lying close and perfectly motionless, like a young plover.'[1]

[1] *The Naturalist in La Plata*, p. 112.

Mr. Lloyd Morgan could detect little sign of shrinking from his hand in plovers newly hatched in an incubator, although 'they lay in the drawer with bill on the ground and outstretched neck in a well-known protective attitude.' Other birds evinced some instinctive shrinking at first, which passed away almost immediately, so that all the species 'would run to my hands after a very short time, nestle down between them, and poke out their little heads confidingly between my fingers.'

From this it appears that, while the protective instinct is congenital and automatic, the specific dread of man is purely imitative, or imparted, or both.

Of all the groups of creatures mentioned in the above-quoted text from Genesis, none have more cause to entertain dread not only of man, but of all other living creatures more powerful than themselves, than fishes. However exhilarating life *on* the ocean wave may be, life *under* the waves is one continual frenzied struggle to devour or to escape being devoured. Few, indeed, and feeble are vegetarian feeders in the sea; almost every marine animal divides its time between pursuit of and flight from its neighbours. Nevertheless, deeply as the habit of fear must be ingrained in the nature of these creatures, some of them profit very readily from reassuring experience, and exhibit a degree of mental receptivity which removes them very far from the category of sentient automata.

The cod, for instance, occupies a somewhat higher place in the animated scale than the aforesaid Mimram trout, yet there is hardly any creature, not even the

herring, which runs so poor a chance of finishing its natural term of life. A very moderate-sized mother cod will be delivered of about one million eggs in a single *accouchement*. If one per thousand of these were to produce a codling that should attain maturity, there would soon be room for very few other fishes in the North Atlantic. But the cod casts its million ova adrift in the ocean to be carried hither and thither by the currents, and the chances against any one ovum, larval fry, or codling escaping the rapacity of other predacious animals must be many thousands to one. One might suppose that heredity and experience would have combined to render the habit of fear and suspicion ineradicable in the survivors. But that is not so. The cod is amenable to confidential intercourse with man, who is certainly not the least formidable of its enemies.

In the extreme south-west of Scotland, where the attenuated promontory ending in the Mull of Galloway projects far into St. George's Channel, there is a remarkable rock basin, partly natural and partly hewn out of the cliff, into which the tide flows through an iron grating. This is the Logan Fishpond, where, for many generations, it has been the custom to imprison fish taken in the open sea, especially cod, to be fattened for the table. If you look quietly over the enclosing wall on the landward side, you will see a circular basin about thirty feet in diameter, fringed with algæ, and so deep that the bottom cannot be seen through the clear, green water. No sign of life is visible, save perhaps a few coalfish or pollack-whiting cruising restlessly

round the narrow limits, or two or three sea-perch routing among the seaweed. But the sound of the key turning in the door-lock and of the keeper's foot upon the wooden stair, rouses the pond into vehement turmoil. Great brown forms arise from the depths; broad tail fins lash the surface, and gaping mouths appear in all directions. Experience has taught these codfish to associate the sound of the keeper's key and footfall with meal-times, and so lulled their natural dread of man that they will eagerly take food from his hand. Some years ago (I know not whether the same may be witnessed now) the aged lady who acted as keeper had imparted further instruction to one or more of these fish. One, at all events, a great cod of about 12 lb. weight, suffered her to lift him out of the water in her arms and place him in her lap, there to receive a meal of mussels or soft crab shoved into his gullet with a wooden spoon. Truly one could hardly imagine a performance more at variance with the instincts and habits of a pelagic fish.

However fully convinced one may be that the lower animals are endowed with conscious and volitional energy, it can hardly be questioned that many of their most definite and characteristic actions are performed in compliance with a motor impulse independent of consciousness or volition; and this not only in extreme youth, but at all periods of maturity.

To select an example first from juvenile behaviour—the homely proverb, 'It's an ill bird that fouls its own nest,' is derived from the cleanly habits of nestlings. Mr. Lloyd Morgan received a spotted fly-catcher, about

a day old, with eyes not yet open. . . . It was placed in a small chip box lined with cotton-wool, and kept in a corner of the incubator drawer. So soon as it had taken a morsel or two of food at intervals of about thirty to forty minutes, it would energetically thrust its hind-quarters over the edge of the box and void its excrement. Jays and other young nestlings also show this instinctive procedure. It would be grotesque to credit a blind nestling with conscious and deliberate hygienic precaution. We ride airily out of the difficulty by pronouncing it to be a 'provision of Nature' that young birds should act in this way for the safety of their own health. I have, indeed, heard this behaviour on the part of young herons described as a deliberately defensive measure. If one climbs a tree in a heronry and approaches a nest containing young birds, they poke their posteriors over the side and discharge a copious and malodorous volley upon the intruder. Such action has all the appearance of design; but it is almost certainly no more than the natural automatic action of young herons undergoing visceral disturbance through fear or excitement.

That is an example of very simple functional activity unconsciously performed; but it can hardly be doubted that some of the most complex and delicate actions of animals very far down in the animated scale are unconsciously performed; or at least undertaken under a mandate with which they automatically comply. The silkworm once only, and at an immature stage of existence, spins an elaborate cocoon which no amount of practice could improve. The evidence of

design is not to be mistaken; but who can suspect the builder to be also the architect? At a given period of its growth the motor nerves of this sluggish larva set in action machinery specialised to work up material which has been unconsciously stored. The action is wholly independent of the creature's volition. It *must* spin, whether it would or no, and it can exercise no discretion in the style or shape of its cocoon.

In the case of spiders we have the action of an adult creature instead of a larva; yet the process seems to be none the less independent of volition. The design is so much more ambitious than the silkworm's, the structure so much more beautiful and complex, and so closely in accord with the principles of human engineering, that one has more difficulty in dissociating it from the independent ingenuity and conscious skill of the worker. Yet the common garden spider (*Epeira diadema*) probably acts unconsciously in setting about to spin her web. She (for it is only the female that spins) does not reflect before setting in motion the mechanism which she has inherited from a remote ancestry, though she must exercise some discretion, involving a mental process, in the choice of a site for her web. She does not gaze with hungry longing upon the flies disporting themselves in the sunshine, speculating how, being wingless, she can capture those toothsome flying creatures. Indeed, probably she cannot see them, for the visual powers of web-spinning spiders are believed to be very feeble, being compensated for by an extraordinary refinement of the sense of touch. She simply sets to work to apply the specialised mechanism

and material with which she is endowed to the purpose for which they are co-ordinate. Although cut off by the period spent as an egg in a cocoon from a parental instruction or example, she is at no loss for a plan. Innate functional impulse, which is probably the right definition of what we term 'instinct,' co-ordinate with certain specialised organs, directs the creature to the unconscious performance of certain definite acts without previous practice or experience. First, the foundations are laid, in the shape of lines enclosing the area to be occupied by the web. From this circumference the radii or stays are drawn to the centre, whence the spider works outwards, stepping from stay to stay and laying down a thread in a wide spiral to act as scaffolding for the finished structure. Finally, having arrived at the limits of the operative net, she retraces her steps, working inwards in a much closer spiral, laying the transverse threads at the proper distance, and devouring, as she goes, the original scaffolding threads which enabled her to perform the work.

If it is difficult to dissociate such a consummate piece of engineering from the operation of a keen intellect, still more so is it to regard the infinitely greater complexity of the snares produced by certain other spiders as the mere product of functional automatism. Nevertheless, that seems to be the true explanation. If the spider's web were the outcome of the creature's individual ingenuity and intelligence, there certainly would be manifest some variation in the design among millions of webs by different individuals of the same species—some imperfection

in first attempts. No such variation—no such imperfection—can be detected. There is no ''prentice hand' among spiders. The first web of the spider is of normal design and perfect construction. Destroy it, and the creature will execute another of exactly the same design, no better and no worse adapted for the capture of passing flies.

Very different is human performance directed by personal intelligence. Suppose that the child of a herring-fisher or a rabbit-catcher had been left as an orphan at five years old, and removed from the scene of his father's industry to the care of some relatives in Glasgow. Circumstances prevail to bring him back to his birthplace as a young man, and to make it expedient that he should earn a living by the same industry as his father did. Motor or functional co-ordination will not help him much, for he can neither swim like a herring nor burrow like a rabbit. He sets his intelligence to work, seeking instruction from adepts in the craft, and then he must obtain suitable apparatus which he could not himself construct, in the use of which he will certainly be very unskilful at first. Even so, he has to avail himself of the example of contemporary fishers and trappers, who are themselves indebted for success to the accumulated experience and progressive inventions of bygone generations. But the net spread yesterday on your rose bush by *Epeira* is of precisely the same design as those which her ancestors suspended in the primeval forest when *our* ancestors were spearing salmon with bone harpoons and shooting deer with flint-tipped arrows.

The instinctively functional habits of those strange gallinaceous fowls *Megapodidæ*—the mound-birds or brush-turkeys of Australasia—are so complex as to seem necessarily to imply intelligence putting experience to practical use. Primarily, no doubt, their domestic economy may be due to the functional activity of certain highly specialised organs, but they have anticipated human ingenuity by the construction of vast incubators, those of some species being co-operative. Several hens of the Australian *Megapodius tumulus* combine to form a mound of earth and green foliage, which they scrape together with their huge feet, walking backwards through the forest and kicking the stuff behind them. It is recorded that one such mound measured 150 feet in circumference, and that this was not the work of one season, but that fresh material was added each spring before a fresh laying took place. The *Megapodius* is a bird no bigger than an ordinary fowl; but the Australian brush-turkey (*Tallegallus Lathami*) is nearly as big as a turkey. I have had the advantage of seeing these birds and examining their work in the Duke of Bedford's woods at Woburn Abbey. Mr. Savile-Kent speaks of *Tallegallus* as nesting co-operatively; but the four or five mounds which I saw at Woburn seemed each to be appropriated to a separate pair. Having piled together a mass of vegetable matter, the hen lays her eggs therein, which are then buried in fresh material, and left to be hatched by the heat engendered by fermentation of the decaying leaves. Nor does she *lay* them in the ordinary sense of the word on their

sides. If she did, and neglected to turn them every day, they would assuredly be addled. Forasmuch as she has not the faintest intention of revisiting the eggs, they are contrived of a peculiar elongated shape, like a soda-water bottle without the neck, and are *set* on end in the material of the mound. The chicks are hatched in due time, and are often so fully fledged on escaping from the shell as to be able to take flight at once, and are able to find without guidance the food suitable for their needs. Hence there is no more possibility of the young birds acting upon instruction or in imitation of their parents than there is in the case of young spiders, seeing that the old birds evade the labour of personal incubation and guidance of the chicks. 'Yet,' says Mr. Savile-Kent, 'the mound-constructing instinct is so strongly ingrained by heredity that young birds taken fresh from the nest and confined under favourable conditions have at once commenced to construct mounds after the characteristic manner of their tribe.'[1] In doing so, no doubt these young and inexperienced creatures are acting under a stimulus communicated from the lower brain centres along the efferent nerves to legs and feet congenitally developed and highly specialised for a peculiar function. So far the birds may be regarded as unconsciously exercising innate proclivity, which, like other idiosyncrasies, attains its highest activity at the season of reproduction. When the adult megapode combines for the first time with others of its species to construct and stock the incubating mound, it is obeying the law

[1] *The Naturalist in Australia*, p. 33.

or, at least, complying with the habit, which has become binding upon its kind. Its acquaintance with the obligation may be considered functionally instinctive; but it involves a performance of unusual complexity. Compliance with an established custom is comparatively easy to understand; at all events, it may appear to be so; but speculation goes adrift in attempting to explain how the custom became established. No matter how big the feet and powerful the shanks of the primeval megapode may have been—no matter how much unconscious satisfaction it may have derived from exercising these organs in piling mounds—how did it hit upon the labour-saving secret that fermenting vegetable substance would supply heat enough to bring the eggs to the hatching? Ordinary evolutional analogy seems to provide no key to fit these complicated wards, neither is one tempted to credit the fowl with knowledge that fermentation generates heat. It is possible that, seeing how prone all gallinaceous fowls are to scraping, the original megapodes may have so excelled in that activity as to have thrown together a fortuitous heap of rubbish, which generated a perceptible heat, thereby tempting them to deposit therein their eggs. It is well known that mother birds of all species never leave the nest during the period of incubation for so long a period as shall expose the eggs to chill. Their absence, in our climate at least, is always exceedingly brief. So the megapode may have found by experience that she could safely leave her eggs in the rubbish mound for a much longer period than in an ordinary nest; until at last, finding the

irksome duty of personal incubation to be superfluous, she abandoned the practice.

It will be observed that this hypothesis assigns to the mother megapode a high degree of intelligent observation and sagacious application of experience. It may be compared with the discovery made long since by human mothers that the substitution of the bottle for the breast in rearing their babes exempted them from the necessity of forgoing social pleasures and from close attendance in the nursery. But the human mother has been careful to transmit the discovery to posterity. The enigma remains how successive generations of megapodes are able to put the experience of their progenitors into practice, seeing that the mother birds not only evade the tedium of personal incubation, but entirely neglect the education, instruction, and nurture of their young, which, fortunately for ourselves, human mothers have not learnt to do.

From the examples given above, chosen almost at random from thousands of others which present themselves to every observer of nature, some material may be gathered for an answer to the first question propounded above. It is an answer very far from authoritative, explicit, or final, consisting mainly of a summary of what is probable. It must consist, indeed, of no more than this, that all animals arrive at birth endowed with congenital automatism co-ordinate with a specific inherited organic mechanism, ready to discharge certain functions without the intervention of conscious volition. But part of the inherited mechanism consists, at least in animals above the lowest

grades, of an apparatus fitted to receive external impressions conveyed along the afferent or incoming nerve currents, and to respond to them by transmitting energy along the efferent or outgoing nerve currents. In short, these animals are supplied with an intellectual and volitional equipment, which, however long it may remain ineffective after birth, is capable of and destined for various ranges of energy and complexity, and differs only in degree and development from the human organ of intelligence. Animals may be judged as coming into the world as sentient, but unconscious, automata, but with mental machinery ready to respond in a greater or lesser measure to experience.

2. *Are the consciousness and intelligence of animals the physical product of chemical and organic changes taking place in the growth of the egg, embryo, or larva, and therefore spontaneous in the sense that muscle, bone, and blood develop by the spontaneous multiplication of cells?*

'If,' says Mr. Lloyd Morgan in his fascinating treatise on *Habit and Instinct*—

'If, on the one hand, it cannot be said without extravagance that an egg is endowed with consciousness, and if, on the other hand, it cannot be said without extravagance that the day-old chick is an unconscious automaton, there must be some intervening moment at which this consciousness has its origin. When is this, and how does it arise? If we attempt to answer this question with anything like thoroughness, we shall open up the further question: From what does that consciousness take its origin? And this would lead to a difficult and, for most of us, not very interesting discussion.'

Be it interesting to many or few, herein lies enfolded the secret hitherto most jealously guarded from human scrutiny—an enigma to which no student of nature can be indifferent. None but a physiologist, which, of course, I have not the slightest pretence to be, need presume to offer any help to its solution; but any intellect of moderate training may derive advantage from recognising and examining the nicety of the problem. Modern lawyers have pronounced that, from the moment of conception, the human embryo has the nature and rights of a distinct being—of a citizen—and accordingly the law deals with one who procures abortion as a criminal. Plato and Aristotle sanctioned the current opinion of their day that 'it was but a part of the mother, and that she had the same right to destroy it as to cauterise a tumour upon her body.'[1] Between these two extreme opinions perhaps lies the truth, namely, that at a certain stage of development the fœtus in one of the higher mammals acquires individual, probably sentient, though still unconscious, automatism. This is hardly a suitable place for the discussion of a theme of this kind. Let us take a bird's egg, as more convenient to handle.

Consciousness may seem too big a term to connote the chick's sensation of imprisonment within the shell, and its impulse to escape, as indicated by hammering and cheeping; though it might pass without comment as explanatory of the action of the adult hen, thrusting her neck vigorously through the bars of the coop and straining for liberty. But Mr. Hudson has

[1] Lecky's *European Morals*, vol. i. p. 94 [Ed. 1869].

observed concerning several species of birds in widely separated orders that, before the shell of the egg was cracked, the chick within, hammering and 'cheeping' in its attempt to get out, would cease instantly and lie perfectly still when the parent bird sounded the note of danger, but would resume operations when she uttered a reassuring note.[1]

From this it appears that the consciousness of the unhatched chick is sufficiently active to exchange oral communications with a mother outside the shell. In fact the chick has been born before it is hatched, and it is suggested that it must be regarded as sentient and conscious from the moment it pierces the air-chamber within the egg and becomes a lung-breathing creature.

The young of gallinaceous and certain other fowls display upon hatching a much more precocious intelligence than other nestlings. They are able to run at once, the megapodes, as aforesaid, being actually able to fly at once and cater for themselves. Their motor organs are so well developed as to respond immediately to their congenital automatism; whereas those birds which are hatched blind and depend upon food being brought to the nest by their parents, acquire the power of locomotion slowly and more or less awkwardly. Similar want of uniformity prevails

[1] *Naturalist in La Plata*, p. 90. Mr. Lloyd Morgan has distinguished at least six notes of different significance uttered by domestic chicks, namely, the gentle 'piping,' expressive of contentment; a further low note, expressive of enjoyment; the danger-note of warning; the plaintive 'cheeping,' expressive of want; a sharp squeak of irritation; and, lastly, a shrill cry of distress, as when a chick gets separated from the rest of the brood.

among mammals. Horses, deer, sheep, and cattle are born with some power of locomotion, with sight, hearing, etc., in active operation, and with mental powers in exercise. The rabbit is born blind and, though sentient, scarcely conscious for ten or twelve days after birth; a period corresponding to about a year of the human span of life. Puppies and kittens, also, are born blind and helpless; and man, though born with open eyes, remains helpless and dubiously conscious for many months.[1]

Again, certain animals which in an early stage of existence may possess a dim power of reflection, and exercise volition in locomotion and the quest for food, pass through a subsequent comatose and unconscious phase. Thus a caterpillar falling into the middle of a road sets off at top speed for the nearest verdure. A few weeks later it loses all power of locomotion, and probably all consciousness, although the motor nerves of the chrysalis cause muscular movements when it is touched.

It seems, then, impossible to indicate precisely the period of existence when consciousness begins. Although the lion cub is born with legs and eyes, the eaglet with wings, legs, eyes, and wings cannot be put to use for long afterwards; but the foal in the

[1] In the *Personal Reminiscences of Sir Frederick Pollock*, vol. ii. pp. 188-9, the following incredible passage occurs: 'Dugald Stewart was once asked what was the earliest thing he could remember. He said it was being left alone by his nurse in his cradle and resolving to tell of her as soon as he could speak.' My sole object in quoting this is to give an example of the kind of uncritical rubbish which has to be cleared away before any progress can be made in penetrating the supersensory mystery.

straw-yard, the plover on the moor, exercise both legs and eyes from the first. The common Mayfly (*Ephemera danica*) spends three years as an unlovely larva, living in mud, swallowing mud, and matching the mud in colour. At the end of this obscure, not to say obscene, period of probation, after passing through several trivial, yet critical, phases, it suddenly appears as a delicate, exquisitely graceful winged creature, endowed with magnificent power of flight, which it puts to immediate use without the preliminary of a trial trip. It baffles all our sense of purpose to understand why all the tedious and ignoble years of preparation should not be the preface to prolonged exercise of the perfected faculties. The pathetic truth is that the Mayfly seldom survives a second or third sunrise after becoming a perfect insect. Flight, love, reproduction, and death—all are enacted within the space of a few hours. The surface of the water will be thickly strewn with the wreckage of the pretty creatures that rose from its depths but yesterday; for eleven months to come it may be that not a single Mayfly will dance in the glade that was so lately dim with a mist of them.

Seeing, then, how irregular is the period that elapses between the birth of animals and their attaining control of the motor faculties, it may be understood that similar uncertainty must surround the question how soon the brain, or its equivalent in the lowest grades, supplies any creature with consciousness or intelligence. From the precocity of instinctive activities, such as was exhibited by Mr. Hudson's young jacana, there

may be inferred a corresponding forwardness in the birth of intelligence, because animals which are soonest thrown upon their own resources must be readiest to exercise their wits, or disappear from the scene of life.

3. *Is the conscious intelligence exoteric? In other words, is it the consequence of external and superior mandate or suggestion, acting upon a suitable physical receptacle?*

This question leads upon ground upon which the light of scientific evidence has scarcely fallen as yet. In those remarkable chapters of the Book of Job, the 38th and three following ones, wherein the Lord answers Job out of the whirlwind, there is a great deal of reference to matter most interesting to the zoologist. They should be read, for lucidity, in the Revised Version:—

'The wing of the ostrich rejoiceth,
But are her pinions and feathers kindly [*or* like the stork's]?
For she leaveth her eggs on the earth,
And warmeth them in the dust,
And forgetteth that the foot may crush them,
Or that the wild beast may trample them.
She is hardened against her young ones, as if they were not hers;
Though her labours be in vain, she is without fear;
Because God hath deprived her of wisdom,
Neither hath He imparted to her understanding.'[1]

Here the author of life is considered naturally as the source of consciousness, nor is any other source likely to suggest itself to one who feels that there must be a designing, controlling, and directing head of the universe. To expunge that factor from our speculations only lands us in darker perplexity. Yet of the nature

[1] Job xxxix. 13-17.

of that Controlling Head, 'whom no man hath seen or can see,' and of the means whereby He may communicate mandates or inspire intelligence, *we have nothing in the shape of evidence.*[1] Wherefore it may seem idle to propound a question to which no answer can be forthcoming. Howbeit, man is insatiably inquisitive; a systematic and resolute attempt has been undertaken to fathom the abyss of supersensory phenomena. The late Mr. Frederick Myers applied a disciplined intellect to the collation and analysis of hyperphysical experience. He was no dreamy enthusiast, subordinating his critical faculties to prepossession or emotional preconception; he was an advanced and erudite evolutionist, versed in the limitations of scientific research, and applying its method to the elucidation of matters which most men of science dismiss either as illusory or outside and beyond the range of research. Few have been found so daring as to follow Mr. Myers over the threshold of his laboratory or even grasp the reality of the enigma to which he addressed himself—not venturing to hope for a solution, only to detect a path which might lead to one; nevertheless, none who is conscious, however dimly, of the presence of a psychical problem, or who has speculated, however inconsequently, upon the phenomena of sympathy, suggestion, will, trance, and automatism, can fail to perceive in Mr. Myers's posthumous volumes[2] the direction in which advance

[1] Doctrine—plenty of it; dogma—enough and to spare; but of evidence in the strict sense, not a jot.

[2] *Human Personality and its Survival of Bodily Death*, 2 vols.

must be made, if the road is not inexorably barred to human penetration.

The inquiry is concentrated upon the spiritual part of the human animal. 'Human personality, as it has developed from lowly ancestors, has become differentiated into two phases: one of them mainly adapted to material or planetary—the other to spiritual or cosmic operation'; and he proceeds upon the assumption that the first is the 'self' of which every human being, from the West Australian savage to the veriest *mondaine*, is conscious; and that the second is a subliminal self, withdrawn from normal consciousness, below or behind the natural man or woman, distinct from the workaday intellect, and beyond the control of the will except so far as the individual may deliberately suppress its monitions.[1] Now I have neither the wish nor the power to pronounce whether Mr. Myers's conclusions are soundly deduced from accumulated and well-sifted evidence, or whether they should be dismissed as plausible and seductive hypotheses. But I will go so far as to suggest that, supposing Mr. Myers to have touched a clue which may lead to proof of the existence of a subliminal self—the receptacle of the spirit of man—and that this spirit, as has been firmly believed by many persons of all ages, is sensible of and obedient to the promptings, injunctions, and warnings of an external Power, further research may identify in creatures lower than man a subliminal self, similar in function

[1] The most primitive races act in the belief that there is part of a man's being beyond his body and his mind. Some of them dread suddenly rousing a person from his sleep, lest his soul be wandering, and, being unable to return in time, death should ensue immediately.

and relation, though inferior in range, to that of man. Herein might be traced to their source the compliance of all animals with the rules which regulate their behaviour and habits; the secret impulse which causes the chaffinch to adhere, generation after generation, to one type of nest and the rook to another; and the impalpable currents of affection, fear, hate, and other psychical forces which act independently of the intellect.

It is difficult to explain the co-operative instinct of dogs as the mere outcome of co-ordinate, congenital activities. Through what avenue has a dog derived a sociable impulse so inveterate that, even when it is segregated from its own kind and adopts man as a comrade, it can do nothing alone? There are depraved dogs which will go hunting and marauding alone, but they are very rare; and perhaps are acting under some perverse suggestion that has found its way to their subliminal conscience. As a rule, dogs will only hunt in couples, in packs, or singly when associated with a human master or mistress. From the stateliest deerhound to the puniest lapdog, none will take exercise alone; provide an acceptable human companion, and the dog will travel all day. And suppose that it should ever be proved that dogs act according to the mandate imposed upon their kind by a superior Power, conveyed through a channel hitherto inscrutable, how could animals lower than dogs—hermit-crabs, for example—be declared incapable of receiving similar supersensory stimulus?

In justice to Mr. Myers's memory, let it be said plainly that he never lent himself to any such hypothesis. On

the contrary, his whole treatise is confined to human personality, and, among human beings, only the elect, as it were; those who have begun to realise their latent privileges. He compares the process of super-sensory development to the primitive stages of animal evolution, when the pigment spot on the skin of some rudimentary organism first became sensitised to light, and the creature received a novel sensation.

The frontier between human beings and other creatures can only be drawn dogmatically and, so to speak, irrationally. Their characteristics and actions blend imperceptibly. Rather than accept Mr. Myers's exclusive doctrine, it is easier for minds accustomed to ponder upon the behaviour of animals to be frankly teleological, and to admit the probability of a Supreme Being and His invisible ministers communicating decrees regulating their conduct through a medium of which none is more than dimly and speculatively conscious.

Assuming a First Cause, instinctive activities in the lower animals may be regarded as the comparatively simple and intelligible results of forces initiated by him, acting unerringly in prescribed directions by means of co-ordinate organs modified by evolution. It is in accordance with the plan of nature that, in their performance of instinctive activities, certain insects should unconsciously take an indispensable part in the fertilisation of flowers specially adapted to take advantage of their visits. An extreme instance, infinitely more bewildering, presents itself when the preservation of the race of both insect and plant depends upon

the insect acting with as much circumspection and precision as could be shown by a human cultivator. Such is the behaviour of the yucca moth (*Pronuba yuccasella*). This insect haunts exclusively the flowers of the yucca, and, collecting pollen from one blossom, kneads it into a pellet which she is said to carry by means of specially enlarged palps to another flower. Here she pierces the pistil and deposits her eggs among the ovules or unfertilised seeds, and then swiftly runs to the top of the pistil and pushes the pollen-pellet into the wide mouth of the stigma. Observe, that without this interchange of offices between insect and plant, the race of each would cease to exist. I am told that it has been proved that the ovules cannot be fertilised unless pollen, preferably from another blossom, is intentionally inserted into the funnel of the stigma; if they were not so fertilised they would afford no food for the grubs of the ministering moth. When all goes well, the grubs eat about half the ovules, leaving a hundred or so to ripen as seeds, and to perpetuate the herb which is essential to the existence of the moth. It is difficult to recognise merely sentient automatism in the means by which this interdependence of host and guest is maintained, the action closely resembling that of effective consciousness. Yet if it be extravagant to attribute to the moth an understanding of vegetable physiology, what is left but to speculate upon the source whence the race of *Pronuba* derives the impulse directing each individual female moth to go through the very same complex performance? 'Amid the mysteries,' wrote Herbert Spencer, 'that become the

more mysterious the more they are thought about, there will remain the one absolute certainty, that we are ever in the presence of an infinite and eternal energy, from which all things proceed.'

Among those who have devoted their lives to probing the enigma of animal intelligence, none has done so with more scrupulous industry in experiment and vigilant research than the late J. Henri Fabre. His years were prolonged so far beyond the usual span that it was his privilege, through reiterated observation, to check, recast, and, in some cases, to revoke his earlier impressions and conclusions. Focussing all his penetrating wits upon the insect world, he not only placed on record a detailed description of the routine behaviour of many genera and species, but also submitted to intense scrutiny the actions of individuals when placed in unfamiliar environment and abnormal circumstance. Fabre's opportunity for this study was so favourable and prolonged — he turned it to such admirable purpose by scientific method and untiring patience, that I am tempted to wind up this vaguely speculative paper by quoting a few sentences from his *Mémoires Entomologiques*—

'Facts speak so loudly that I do not hesitate to translate their evidence as I understand it. In insect mentality we have to distinguish two very different domains. One of these is *instinct*, properly so called, the unconscious impulse that presides over the most wonderful part of what the creature achieves. . . . It is instinct alone that makes the mother build for a family which she will never see: that counsels the storing of provisions for the unknown offspring: that directs the sting towards the nerve-centres

of the prey and skilfully paralyses it, so that the game may keep fresh: that instigates, in fine, a host of actions wherein shrewd reason and consummate science would have their part, were the creature acting through discernment. This faculty is perfect of its kind from the outset, otherwise the insect would have no posterity. . . . It is not free nor conscious in its practice, any more than is the faculty of the stomach for digestion or that of the heart for pulsation. . . .

'But pure instinct, if it stood alone, would leave the insect unarmed in the perpetual conflict of circumstance. Though the background remains the same, the details change: the unexpected rises on every side. In this bewildering confusion, a guide is needed to seek, accept, refuse, and choose. . . . This guide the insect undoubtedly possesses, to a very manifest degree. It is the second province of its mentality. Here it is conscious and capable of improvement by experience. I dare not speak of this rudimentary faculty as intelligence, which is too exalted a title: I will call it *discernment*. . . .

'So long as we confound acts of pure instinct and acts of discernment under the same head, we shall fall back into those endless discussions which embitter controversy without bringing us one step nearer the solution of the problem. Is the insect conscious of what it does? Yes and no. No, if its action is in the province of instinct; yes, if the action is in that of discernment.'[1]

[1] *Bramble Bees and Others*, by J. Henri Fabre, translated by A. Texeira de Mattos, 1915.

December

XLVII

Who was St. Enoch?

Travellers from London to Glasgow who choose the Midland route (and they cannot choose a better) take their departure from a station bearing the name of St. Pancras and arrive at a terminus entitled St. Enoch. Personally I have never been asked any questions about St. Pancras, so I presume the general public is perfectly informed about him—that he was a Roman schoolboy of patrician descent, in the reign of Diocletian, that he suffered martyrdom at the age of fourteen, and that three centuries later St. Augustine (who, however fiercely he chastised the Pelagians, was ever tender-hearted towards children) dedicated to St. Pancras the first pagan temple consecrated for Christian worship in England.

But as regards St. Enoch, the mind of the man in the street seems to be a blank. If I had received a guinea for every time the question which stands at the head of this paper has been put to me, well—the Chancellor of the Exchequer would have received a little more on account of income tax. I was not ashamed of not knowing the answer; I got bored by saying that I did not know, and determined to hunt up what information could be had.

Works on hagiology may be searched in vain for any

saint bearing the name of Enoch. Of the four Enochs who figure in Holy Writ none was eligible for canonisation—not even he who was 'seventh from Adam' and father of Methuselah—for canonisation is a Christian doctrine, and these all lived before Christ. What between the preposterous orthography of the Goidhelic branch of Celts and the happy-go-lucky spelling of mediæval scribes, the identity, nay the very sex, of our St. Enoch has been so successfully obscured that a clue thereto can only be picked up in the city records of Glasgow in the sixteenth century, wherein mention occurs of 'San Theneukes Kirk,' which name, appearing later as St. Tennoch's and passing through various other phases, has become finally and firmly stereotyped in its present perplexing form—St. Enoch's.

In examining the ancient topography of Glasgow one has to remember that the word 'gate' retained in Scottish speech its original meaning of a road or street long after it had acquired another meaning in southern English. 'Gang your ain gate' is still good Scotch for 'Mind your own business'; and what would now be called a city gate, if any of our cities still had gates in that sense, was known as a 'port.'

> 'Throw open the West Port and let us gang free,
> Ye 've no seen the last o' my bonnets and me.'[1]

The street now named Trongate was formerly St. Thenew's Gate leading straight to the chapel and well of St. Thenew, now obliterated. Towards the close of the fifteenth century a public 'trone' or weighing machine

[1] Sir Walter Scott made a slip in this couplet. Dundee rode out by the Netherbow Port, and westward along the Lang Dykes, now Princes Street.

was set up, and, forasmuch as a substantial object of general utility appealed more directly to the citizens than the shadowy memory of a saint, the street came to be known as the Trongate, which name it still bears.

All this local lore does not lead much nearer to the personality of St. Thenew. Brief, for the most part, and where they are extended very conflicting, are the notices of this royal lady; for such, according to all accounts, was the rank and sex of the individual described as Thenew, Tenaw, Thanes, Thaney, or Thennat, according to the way the writer chose to represent the sound of a name which the owner thereof certainly never dreamt of committing to paper or parchment. The chief authority for the strange life she led are Herbert, Bishop of Glasgow, who died in 1164, and Joceline, a Cistercian monk of Furness, who addressed his compilation to Herbert's successor in the see of Glasgow—another Joceline, who died in 1199. But whereas Thenew died in 514, neither of these can be held original authorities; indeed, they would never have troubled their heads about Thenew had not each of them undertaken a biography of her more famous son Kentigern.

It is the despair of antiquaries that the material from which these biographies were compiled has not been preserved, namely, narratives in the Celtic language composed shortly after St. Kentigern's demise. It is indeed exasperating to be told both by Bishop Herbert and Brother Joceline that they had so dealt with these ancient manuscripts as to make them agreeable to the literary taste and conformable to the current orthodoxy

of a later age; 'because,' as Joceline remarks with a smug complacency that would have made Kentigern himself swear, 'they are stained throughout by an uncultivated diction, discoloured and obscured by an inelegant style, and, what any discreet man would abhor still more, something contrary to sound doctrine and to the Catholic faith very evidently appeareth.' In short, the saint's life has been handed down to us garbled by narrow ecclesiastics and edited by prejudiced pedants, working at a distance of 400 years from the original. It is therefore irremediably shorn of its value as the testimony of eye-witnesses to a primitive state of the community. In this matter Joceline is the worse offender of the two, shutting off all the light shed upon those far-off days, save such rays as might pass through the coloured glass of the Church of Rome.

Joceline states that Thenew was the daughter of Lothus, a pagan king reigning early in the sixth century over some part of North Britain—Lothian, according to Bishop Herbert. This Lothus is the same as Llew or Llewddyn Llueddog of Dinas Eiddyn—that is Dunedin or Edinburgh—whose gests are told in the Welsh *Mabinogion*, where Thenew appears as Dwynwen or Denyw. Arthur of the Round Table is said to have bestowed upon Lothus that district which thereby got the name of Lothian. If Llew or Lothus was *secta paganissimus* as Joceline avers, or even *vir semi-paganus* as Bishop Herbert more mildly describes him, Christian Arthur had to pay heavily for installing him in power; for it was Llew's son, Medraut or Modred, who seduced Guinevere and slew Arthur at the battle of Camlan.

But it is only with Modred's sister that we are here concerned. Born in a land where paganism was falling back, fiercely resisting, before the soldiers of the Cross, Thenew, though not yet baptized, became an ardent proselyte of the new religion, 'exercising herself in the discipline of the true faith, so far as she might without incurring her father's anger.' The outcome of these exercises was scarcely calculated to diminish the king's objections. Thenew, we are told, became so deeply absorbed in contemplation of the Virgin Mary as to become possessed by the ambition of emulating her by an immaculate conception. Fervently and incessantly she prayed that she might become the mother of a fatherless child. Profane persons may recognise one of Boccaccio's favourite themes in what happened to the young woman who indulged in such hazardous fancies. She became *enceinte*.

Now if King Llew was a pagan, he was also a person, it seems, of very austere morality. When he became aware of his daughter's condition, he declared that the law of his realm should take its course—a law which condemned any maiden convicted of impurity to be flung from a precipice and her paramour to be beheaded. Accordingly Thenew, declaring solemnly that she had sinned with no man, was taken to the top of Dunpender (now called Traprain Law) in Haddingtonshire and 'the servants of the king hurled her from the top of the mountain. A marvellous thing happened, unheard of from ancient times. When she fell she was not bruised . . . like a feather-clad bird she glided to the ground in an easy descent.' Thus Joceline succinctly:

Bishop Herbert goes into more detail, describing how the girl was put into a waggon which was sent backwards down the mountain.

The king was considerably at a loss to account for his daughter's escape. Could there be any truth after all in this Christian gospel? Had Thenew's God really interfered to protect her? or was it the effect of black magic, as his own priests affirmed? Well, she should have the benefit of the doubt. He commanded that she should be cast adrift on the sea in a coracle—*parvissimo lembo de corio*—without paddle or sail, 'and so let her God free her from peril or death if he can or will!'

So they took the luckless lady to Aberlady—the Mouth of Stench, so called because of the quantity of fish landed there—whence she drifted to the Isle of May, at that time, says Joceline, 'a great resort of fishermen from England, Scotland, and even from Belgium and France.' Finally, the coracle stranded at Culros, where she brought forth a man child on the open beach. Some shepherds found her and reported to Servanus, the evangelist of Fife, who kept a school at Culros. Servanus, better known now as St. Serf, having listened to Thenew's story, not only took the most charitable view of the babe's parentage, but by an ingenious piece of sophistry persuaded his pupils that the infant was the fruit of a union 'exceeding lawful marriage in sanctity.' 'If proof were wanting,' said he, 'it was to be found in the fact that when he was in his oratory after morning lauds that very day, he had heard the *Gloria in excelsis* sung by an invisible choir,

a phenomenon which had puzzled him very sorely at the time.'

Bishop Herbert's narrative ends abruptly at this point; but from Joceline we learn that Servanus baptised the young mother by the name of Taneu, and her boy by that of Kyentyern or Kentigern, meaning 'over-lord.' But this was only a full-dress name. So fond did Servanus grow of the lad that he always called him 'Munghu'—that is 'my darling'; and Mungo is the endearing appellative by which the saint is commemorated in many Scottish dedications, including that of the great cathedral at Glasgow. It has passed into an inelegant form in Strathbungo, suggesting the prevalence of nasal catarrh in Glasgow suburbs.

Mungo seems to have been a precocious child, among other noteworthy deeds restoring to life his patron's pet robin which his schoolfellows had pelted to death. Of even greater service to Servanus was the miracle whereby his pupil raised from the dead a particularly good cook who had expired in the establishment. But about the poor little mother not another word from Brother Joceline; only in the *Breviary of Aberdeen*, a singularly Munchausenish compilation, it is stated that she went to live with her son when he was settled in Glasgow, where she received honourable burial.

It is dull work to wade through these impudent monkish fabrications; it would not repay the trouble but for the glimpses one obtains here and there of our people slowly emerging from primitive barbarism. And one lays down the book, marvelling that Christianity

has maintained its hold upon a nation to whom it was once presented interwoven with falsehoods which were an affront to intelligence of the most moderate order.

XLVIII

Every salmon-fisher must be familiar with those still autumn days when the objects of his pursuit seem to be competing with each other in fantastic forms of leaping. Flinging themselves into the air, they come down anyhow—head first, tail first, broadside, or merely in that inglorious fashion known to schoolboys as 'a gutter.' How fitly, one reflects, was this most chivalrous of fishes named Salmo—the salient or leaping creature. Many other kinds of fishes, both marine and fresh-water, leap occasionally; but none so frequently and persistently as the salmon. He cannot rest long in a pool without throwing himself into the air and falling back with resounding splash, apparently in sheer exultation and exuberance of energy. One writer has followed another in explaining this habit as being due to desperate attempts on the part of the fish to rid itself of parasites, but the salmon leaps just as often after the marine parasites—tide-lice, etc.—have dropped off, sickened by the fresh water, and before the river copepods have attacked its gills, as it does at any other time. Neither is it the outcome of juvenile lightheartedness, seeing that the ponderous kipper of twenty or thirty pounds weight is just as prone to saltatory feats as any four-pound grilse. Only one thing about it commands the assent of every experienced angler, namely,

The Food of Otters

that when salmon are most in the mood for leaping they are least in the mood for taking the fly.

It was in this melancholy strain that my thoughts ran one fine September day after fishing a famous beat on the Spey[1] without inducing one of scores of great fish that were showing themselves to make so much as an offer at any of my daintiest lures. The water was in perfect trim; the day, though a trifle hazy, was just such an one on which, in former seasons, I had had plenty of pulling; the river was full of fish, chiefly large ones, for on the previous day our party had landed twelve salmon averaging 22½ lb.; most of these fish were fresh in from the sea, which was only a couple of miles distant; yet not one of them could be tempted to take hold.

Presently my thoughts were diverted into another course by the spectacle of a pretty, clean-run salmon about 12 lb. weight, lying dead on the gravel with the 'otter's bite' taken out of the thick of the shoulder. Just that bite and no more—two or three ounces of flesh, for such is the otter's wasteful practice. He hunts down his fish; devours the morsel, always taken from the same place, and often leaves the fair carcase to be torn to pieces by gulls, crows, rats, and eels, unless some crofter happens to pass that way before they get their innings, and so secures it for his own larder. This habit has earned for the otter in some parts of the Highlands the grateful sobriquet of *caraid-nam-bochd*—the poor man's friend.

There are—or were before the war—about twenty packs of otter-hounds in the United Kingdom. Some

[1] Braehead, Spynie, and Corngabie in the Gordon Castle water.

enthusiasts in that sport protest indignantly when owners or lessees of salmon fishings attempt to protect their property by traps against the depredations of otters. I have been gravely assured by an official of one of these packs that otters disliked salmon, living exclusively upon eels and frogs. If he was correct, then I suppose that it must have been waterhens or cock-robins that slaughtered many a fine fish that I have seen treated in the manner described above—female salmon killed in the act of spawning and the ripe ova scattered along the shingle for twenty or thirty yards. Frogs, indeed! It would seem an aimless waste of power if the otter's lithe build and superb speed had been bestowed upon him or acquired for the pursuit of sprawling batrachians. No doubt otters eat frogs as readily as schoolboys eat gooseberries, but a Highland salmon river is not an ideal home for frogs, and the otters frequenting such a river must surely have some other game in view. Eels? undoubtedly; and every eel that the otter catches must be set to the credit of his account; but he is too gallant a sportsman to content himself with eels. 'The food of the otter,' says Mr. L. C. R. Cameron in his excellent treatise on *Otters and Otter Hunting*, 'is of great interest to those who are asked to preserve him from an untimely death by gunshot, trap, and net. It is a point upon which, from time immemorial, he has been cruelly maligned. . . . Fish are not the otter's only—not even its favourite—diet.' When a statement such as this is made in the very teeth of the experience of riverside observers, the likeliest means of arriving at the truth

is to take the evidence of competent and trustworthy witnesses on either side. Keeping my mind as open as possible on the subject, I shall summon two such witnesses, one on either side, and leave the reader to form his own conclusions. Reversing the usual course of criminal trials, the first witness called shall be one for the defence.

Hearing that the late Sir Albert de Rutzen, the well-known London police magistrate, had reared an otter cub and kept it for many years as a household pet, I wrote inquiring whether he had found that it really preferred eels to other fish. He replied as follows:—

'I had a tame otter for more than twelve years. I caught him when he was about the size of a small ferret, and he was brought up on bread and milk, for which he retained a liking till the day of his death, and therefore there was no difficulty in keeping him in a place where it was not easy to get fish. I invariably noticed that, whatever mixture of fish was put down before him, he would always select an eel if there was one among the lot. I have paid many visits to fishmongers' shops with him. On one occasion I was in Bond Street, and we stopped some little time at two fish shops—Grove's and another one. In the early morning, before the dew was off the grass, he was very fond of catching frogs. I never saw him eat the whole of one, but there was not much of the frog left when he had done with it. He used to come out with me and two terriers. They were on the best of terms. I have seen the terriers find a rabbit and go off full cry, with the otter after them as fast as he could go. I never saw him show any sign of hunting the rabbit, but he evidently knew there was something up and was anxious to know what it was all about.

'There was a stream which ran into a tidal river close to my old home. At low tide there was little water in the stream,

and I have seen the otter turning over the stones with his nose. Under nearly every stone there was an eel or two—worse luck for them! He would retrieve a stick out of the water, no matter how rapid was the current.'

All this goes to confirm the otter-hunter's doctrine that their client is so fond of eels and frogs as to be indifferent to salmon, which are far more difficult to catch, and that the presence of otters in a salmon river may be tolerated, even encouraged, by salmon-fishers.

Audi alteram partem. I put in the witness-box that remarkable pair of brothers, John Sobieski Stuart (1795-1872) and Charles Edward Stuart (1799-1880), who claimed legitimate descent from Prince Charles Edward, and whose tomb is at Eskadale on the Beauly. Their evidence is given in *The Lays of the Deer Forest*,[1] a book now well-nigh forgotten, but one that deserves a place in every sportsman's and naturalist's library, not for any merit in the Lays themselves (upon which, having refrained from reading them, I scarcely feel justified in expressing an opinion), but for the wealth of original observation recorded in the notes which entirely fill the second volume. The incident described took place on the Findhorn, than which I have never fished a wilder or more romantic Scottish river.

'In mentioning this brave, beautiful, and intelligent beast [the otter] among the "rascals," it is entirely against our own feelings, in compliance with the received laws of woodcraft, and because we cannot by our veto change the custom of seven hundred years. But the courage, talents, and activity of the animal—the beauty, and sometimes splendour of the scenery in his haunts—the exquisite music of the hounds,

[1] Published by Blackwood, Edinburgh, 1848.

and, especially in night hunts, the romantic character of his chase, entitle him to a royal rank of venerie far before the cowardly, savage, and stupid wolf or Sir Tristrem de Lion's and Dame Juliana Berners's draggle-scutted, furrow-skulking "King of Beasts"—the hare. . . .

'One morning, after having been out in the forest all night to wait for roe in the two twilights, I came down to cross at the pool of Cluag. There was a broken and dangerous ford at its throat, passable only when the water was low. I observed the track of otters across the little sandy bank, which swelled out on the east side of the ford, and that they were going up the stream, and none descending.

'In ascending a river, if the banks will admit, the otter invariably leaves the water at the rapids and takes the shore to the next pool; so that, if there is an otter on the stream, his up-track is sure to be found at these places. In returning, however, he will often float down the rapids with the current. The prints which I had found on the sand had been made during the night. There was a *chance* that the otters had not returned, and I climbed into the oak over the pool to see what might come down. Enveloped in the screen of leaves which the brightness of the surrounding sun made more obscure within, I had a view up the rapid above and into the pool beyond. I had sat in the oak for about half an hour, with my eyes fixed on the stream and my back against the elastic branch by which I was supported, and rocked into a sort of dreamy repose, when I was roused by a flash in the upper pool, a ripple on its surface, then a running swirl and something that leaped and plunged and disappeared. I watched without motion for some moments, but nothing came up, and I began to doubt that it was only one of those large, lazy salmon which neither the wing of peacock or bird of paradise or any other delusion in gold or silver can tempt to the surface, but which, after refusing all that art can offer, comes weltering up from the bottom and throws himself splash over your line.

'Just as I was thinking how often he had treated me with

this impertinence in that same place, I saw two dark objects bobbing like ducks down the rapid between the two pools; but immediately as they came near [I] distinguished the round, staring, goggle-eyed heads of two otters, floating one after the other, their legs spread out like flying squirrels, steering with their tails, the tips of which showed above the water like the rudder of an Elbe *scuite*. Down they came, as flat as floating skins upon the water; but their round short heads and black eyes constantly in motion, examining with eager vigilance every neuk and rock which they passed.

'I looked down into the pool below me; it was as clear as amber, and behind a large boulder of granite, in about eight feet of water, I saw three salmon—a large one just at the back of the stone, and two smaller holding against the stream in the same line.[1] They lay sluggish and sleepy in the sunshine, without any motion except the gentle skulling of their tails. The otters were steering down the pool, bobbing and flirting the water with their snouts, and now and then ducking their heads—till they came over the stone. In an instant, like a flash of light, the fish were gone, and where the otters had just floated there was nothing but two undulating rings upon the glossy surface. In the next instant there was a rush and a swirl in the deep, under the rock on the west side, and a long shooting line going down the rapid. . . . Near the tail of the pool there was another rush and turn, and two long lines of bubbles showed that the otters were returning. Immediately afterwards the large salmon

[1] I have observed that salmon habitually lie *in front* of an isolated rock in mid-current, where the stream is lifted in an even flow to surmount the obstruction, and not immediately behind it, where the water is swirly. A friend of mine having disputed the accuracy of my observation, I took him to the bridge across the Kvina, just below the village of Liknæs in the Flekkefjord. Looking over, we saw five salmon lying in the crystal clear stream, and each one lay just upstream off a large submerged boulder. Of course, in a rocky stream like the Findhorn the salmon described by Stuart might easily have a boulder above it as well as behind it.

came out of the water with a spring of more than two yards, and just as he reentered the otter struck him behind the gills, and they disappeared together, leaving a star of bright scales on the surface. I now lost sight of them in the agitation which they had made, but I marked the bubbles here and there as the chase was pursued in the deep water. Several times they came to the surface, the otters always keeping below the fish, for the two smaller [salmon] had disappeared, and both the hunters were now in close pursuit of the large one. They followed with the rapidity of lightning, and from the frequency with which they turned the fish, appeared to have the superiority in speed, and no disadvantage but the difficulty of clipping the round, slippery bulk of the salmon. The skill with which they pursued their game was like that of a well-trained greyhound in a course. Whenever they came to the throat of the pool they pressed the fish hard to make him double into the clear water, and one [of them] was always vigilant to make him rise or turn, the increased efforts of which exhausted his strength. With equal sagacity they worked him at the tail of the pool to prevent him descending the rapid. Twice in returning, as the fish doubled round the boulder behind which he had originally lain, the nearest otter made a counter-turn in the opposite direction, and caught the salmon as they met, silvering the water with a flash of flying scales.

'With this race the fish began to tire and the otters continued to press him, till at last all three appeared turning and struggling and knitting together in the deep water, came up to the surface in a heap, rolled over and over, the otters coiled in a ring and the fish splashing between them. . . . Suddenly all disappeared and left a thick circle of bubbles. In a few moments they rose again. . . . By this time one of the otters had fixed the fish behind the shoulder-fin, and both were working towards the further bank. . . . As they dragged the fish up the bank, he appeared quite dead, and they had just reached their heap, when there came a whistle from the Logie Brae, and a whoop which startled

them. . . . For a moment they watched; then slid to the water's edge like eels—hearkened again, turned their long curved whiskers over the edge of the pool, and slipped into the water.

I could easily have shot them both during their hunt, and more surely when trailing the fish up the bank, for they were not thirty paces distant, and my double gun was loaded with BB; but the intense interest of their chase left no other thought. . . . Seeing there was nothing more to be done, I descended from my tree, and carried home the salmon, which weighed twelve pounds and a half.'[1]

I offer no excuse for quoting at so great length from a work published more than seventy years ago. Nowhere else have I met with so vivid and minute description of otters in pursuit of their prey. It is but one of many scenes in wild Highland sport related by the Stuarts.

I began by undertaking to cite but two witnesses. Wishing to give the prisoner at the bar all chances in his favour, I now call a third in the person of Charles St. John.

'I am daily more and more convinced,' says he, 'that the otter is by no means so great an enemy to salmon as he is supposed to be, his general food being trout, eels, and flounders; although of course when a salmon comes his way he is sufficiently an epicure not to refuse it. An otter seldom kills a salmon without leaving enough of the fish to betray him, as most people who live near salmon rivers know full well; but the remains of trout and eels which he kills are not so conspicuous.'[2]

On the other hand, St. John has a story in another

[1] *Lays of the Deer Forest*, vol. ii. pp. 269-74. Edinburgh, 1848.
[2] *A Tour in Sutherland*, vol. ii. p. 48. London, 1849.

of his books which tells directly against the view expressed above. After giving minute instructions how to set a trap for an otter, and describing how he 'had some strong traps placed on a sandbank where otters were in the nightly habit of landing,' he proceeds as follows:—

'I was rather amused at an old woman living at Sluie on the Findhorn, who, complaining of the hardness of the present times, when a "puir body couldna get a drop smuggled whisky, or shot a rae [roe] without his lordship's sportsman finding it out," added to her list of grievances that even the otters were nearly all gone, "puir beasties."

'"Well, but what good could the otters do you?" I asked her.

'"Good, your honour? why scarcely a morn came but they left a bonny gilse on the scarp doun yonder, and the *vennison* was nane the waur of the bit the puir beasts ate themselves."

'The people here call every eatable animal "venison," or as they pronounce it "vennison." For instance, they will tell you that the snipes are "good vennison," or that the trout are not good "vennison" in the winter.'[1]

Luckily there is room in our rivers for both otters and salmon; and there is far more probability of salmon verging towards extinction through the drastically effective means of capture now in use, than there is of the disappearance of so vigorous, wary, and furtive a creature as *Lutra vulgaris*.

Yes, furtive. It would add much to the interest of a waterside ramble if one caught sight occasionally of this beautiful animal. None of our native wild animals

[1] *Wild Sports of the Highlands*, chap. xii.

Miss Holms and her Otter

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has imbibed a more intense distrust of man than the otter, and none, except the badger, succeeds so well in escaping observation. Although I have spent—serious people will say wasted—much of a long life beside many waters, only twice have I had the good fortune of watching an otter unobserved. Once, when I was fishing the Haly Weil at Bemersyde on the Tweed, and once a few months ago on the Sanctuary Loch at Monreith. It was a dark December day, drizzling and windless, when, as I passed along the lake-side, I noticed what I took for a log floating motionless on the calm water about forty yards from the shore. Presently, however, the log began to move, and revealed itself as an otter swimming straight towards me. Slipping behind the trunk of a big beech, I watched the beautiful, lithe creature as it came ashore within a few yards of my hiding-place.

The plate herewith represents my fair neighbour Miss Holms, who has reared an otter from babyhood, and educated it as a docile and elegant pet.

Of the order *Carnivora*, nine terrestrial species once roamed in Galloway, whereof five must now be written off as extinct, namely, the wolf, the true wild-cat, the pine-marten, the badger or brock, and the polecat or foumart. Four species remain—the fox, the stoat, the weasel, and the otter. Of marine *Carnivora* we may still reckon the common seal (*Phoca vitulina*) as resident on our coast, and the grey seal (*Halichoerus grypus*) as an occasional visitor.

XLIX

Mottoes

Heraldic mottoes may be reckoned among the trivialities of blazonry. The shield and its charges are sacrosanct; no British subject is entitled to assume armorial bearings, or alter those which he has inherited or received, without a fresh grant or patent from one of the Kings of Arms—Garter, Lyon, or Ulster. In Scotland, indeed, Lyon King is still legally empowered to seize all goods and furniture whereon arms may be found displayed that have not been duly matriculated, and, in addition, to fine the owner £100 Scots; though it may be doubted whether any civil court would impose the penalty. But there is no objection, statutory or other, against a man adopting what motto he may fancy, and some amusement may be derived from tracing the play of such fancy in the choice of mottoes that have become hereditary in certain old families.

Several years ago what was at that time the principal hotel in Princes Street, Edinburgh, was rebuilt and reopened under the auspices of one of 'the clan that is nameless by day.' Over the entrance was carved in bold characters the motto of the said Clan Alpin (Macgregor), 'E'en *do* and spare nocht!' which might be interpreted by thrifty tourists as a warning to seek quarters where they were less likely to be *done*.

To modern apprehension nothing short of violence and rapine breathes in the alliterative motto of the Dukes of Atholl, 'Furth, Fortune, and fill the Fetters!' The truculence of this sentiment may be condoned

when it is read in connection with three centuries of war waged between England and Scotland. The revenues of landowners were then exceedingly precarious: rents at the best of times were paid almost wholly in kind, and when produce and stock of all sorts had been destroyed or 'lifted' by an invading army, the lairds had to indemnify themselves somehow. The most sporting and popular experience was to waylay or capture from the enemy some opulent baron and hold him to ransom. I must guard the reader from inferring that this was the *only* use of the fetters; but it was one.

The same idea is more naïvely and modestly conveyed in the motto of the ancient Border family of Riddell, 'I hope to share.'

Crossing the Border, one finds the great house of Percy also 'hoping.' They were content during the troubled fourteenth century with the bland ejaculation 'Espérance.' But before the seventh Earl had followed his father to the scaffold in 1572, this motto had been amplified into 'Espérance en Dieu,' an exemplary sentiment, in good sooth, and perhaps it is ungenerous to make any sinister inference from the constant association of the original 'Espérance' with the well-known Percy badge—a fair crescent enclosing, on a ground half blood-red and half sable, a golden fetter-lock, surely a fitting hieroglyphic for midnight raiding.

The mention of a crescent reminds one that, to this day, the full moon is known on Loch Lomondside as 'Macfarlane's Lantern,' reminiscent of the nocturnal activity of that most acquisitive sept, whereof the chief

was content with the innocent legend 'Loch Sloy,' the place of muster for a driving raid.

For cynical frankness nothing can beat the crest and motto of the Kirkpatricks of Closeburn—a hand holding a dagger distilling drops of blood, with the legend, 'I make sure' (or 'siccar' as it ought to be), for these were the words with which Sir Roger prefaced the *coup de grâce* he gave to the Red Comyn before the altar of the Grey Friars of Dumfries. As a purely militant motto, none is nobler than that handed down from the same time by the Good Sir James of Douglas, 'Jamais arrière.'

As head of the Macphersons—the great Clan Chattan—Sir John Macpherson Grant still displays the warning, 'Touch not the Cat but [without] the Glove,' nor used it to be wise to disregard it in dealing with this turbulent sept.

The county Palatine of Lancaster lies too near the Scottish Marches for its knights of yore to affect pacific intentions; wherefore the de Traffords, whose forebears Norman William found established there, explain the secret of their permanence by the bold phrase, 'Gripe griffin; hold fast!' their arms being a red griffin on a white field. The Stanleys, too, have been settled long enough in the north to warrant their motto, 'Sans changer,' albeit it did not restrain two Earls of Derby from changing political sides during last century—the 14th earl from a Whig to a Tory, and the 15th earl from a Disraelian Conservative to a Gladstonian Radical. A like fond aspiration for stability in an unstable world is conveyed in 'Bydand,' the motto of

that branch of the Gordons now represented by the Duke of Richmond and Gordon, and by 'Stabo,' that of the Hathorns of Castle-Wigg.

In these days when anything of a missile nature will do to fling at landowners, it behoves them to be guarded in the admissions they may be tempted to make as to the nature of their title-deeds. Was it prudence, then, or a nice sense of humour that caused the Dukes of Argyll to exchange their eighteenth-century motto, 'Vix ea nostra voco'—I can scarcely call these things my own—for the more colourless one, 'Ne oblivis-caris'? The qualities for which bygone knights and barons proclaimed their preference by a choice of mottoes is not always conspicuous in their descendants. A friend of mine with a very long pedigree inherited with his title the simple motto, 'I am ready'; and *I* am ready to back him to have missed more trains than any other man of his age.

Mottoes framed as puns or *jeu de mots* upon surnames are generally senseless and often irritating. One of the best is a play upon the name of Fane, Earl of Westmorland, 'Ne vile fano'—Offer nothing unclean in the temple (or to a Fane). It is a shade less frivolous than 'Templa quam dilecta'—How charming are the Temples—borne by Sir Richard Temple of the Nash. 'Festina lente' for the Earls of Onslow may pass, and so may 'Ne vile velis'—Desire nothing ignoble—for Nevill Marquess of Abergavenny, seeing that both legends convey, however insipidly, more or less of precept. Doubtless there are members of the present Parliament retaining a kindly remembrance of

Sir Charles Forster, who received a baronetcy in 1874 and with it the punning motto, 'Sit fors ter felix'—May his lot be thrice happy; but what can be said for the silly platitude of 'Ver non semper viret'—Spring-tide does not last for ever—for the Vernons? How much more inspiring a bold command, such as 'Gang forward!' of the Stirlings, or 'Gang warily' of the more canny Drummonds, who emphasised their advice by setting their shield of arms in a compartment strewn with calthrops. 'Boutez en avant!' of the Irish Barrys has a fine Donnybrook ring in it.

It must surely be due to the affected pedantry of eighteenth-century heralds, pursuivants, and clerks that so many of our more recent armorial families are afflicted with mottoes of preposterous inanity. Not that the Earl Marshal himself doth set a very inspiring precedent with his 'Sola virtus invicta,' whether one construes 'virtus' as 'valour' or 'virtue.' But that seems almost fiery alongside of such a Pecksniffian composition as has been inflicted upon Lord de Ramsey. 'Patientia et perseverantia cum magnanimitate.' Why omit any of the cardinal virtues from such a proclamation of ruling motives? Compare that with the manly Huguenot legend borne by Baron de Villiers, Chief Justice of South Africa, 'La main à l'œuvre!' or with the Duke of Hamilton's emphatic 'Through!' The science of heraldry, once as exact as it was exacting, ought not to be responsible for labelling honourable families with copy-book commonplace such as 'Immersabilis est vera virtus'—True valour is irrepressible (Codrington, Bart.), or 'Sola bona quæ

honesta'—Only honest things are good (Lord Colebrooke).

Nothing in heraldic lore is more quaint than the traditional origin of the motto, 'Honi soit qui mal y pense,' adopted for the oldest extant Order of Chivalry in the world—the Garter. Knights of the Thistle are well content with the motto of the Kings of Scotland, 'Nemo me impune lacessit,' or, as Scots love to have it in the vernacular—Wha daur meddle wi' me?—a sentiment so finely condensed into 'Defence not Defiance' for the Volunteer Force lately extinguished. As for the Order of St. Patrick, its motto, 'Quis separabit?'—Who shall separate us?—will receive a different answer according to the quarter to which it is addressed.

To conclude: there never was a nobler motto devised for any peer than that conferred upon John Scott, son of a Newcastle 'coal-fitter,' when he was raised to the peerage as Lord Eldon in 1799, and received with his grant of arms the legend, 'Sit sine labe decus'—Let honour be stainless!

The Nankin Lily.

In sounding the praise of this beautiful lily on page 146 I meant, but forgot, to add a mild but firm protest against the scientific title—*Lilium testaceum*—which modern classifiers have affixed to it. Now *testaceum* means 'of the colour of brick' or, at best, of terra-cotta, which is a gross libel

on the apricot flushed with rose—the true colour of the corolla. When first I made acquaintance with this lily, *dans le temps*, it was known as *Lilium isabellinum*, a latinised rendering of the French *isabelle*, that is 'dove-coloured'—the colour of a turtle dove's breast, which pretty closely matches the flower.

What adds to my regret at parting with this name is the romantic origin of the word *isabelle*. In 1601, when Archduke Albert laid siege to Ostend, his wife Isabel, daughter of Philip II. of Spain, vowed that she would not change her chemise till the city was taken. The siege lasted three years and ten weeks, and when the Archduchess at last doffed her chemise, it was of a hue which the French dyers set about to match, and Parisian milliners poetically ticketed it *isabelle!*

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come to the foot-hills of Judea. With him you slowly become conscious that the long series of marches is planned to culminate in an assault upon Jerusalem. Now you are part of a dusty column winding up into Judea by the Jerusalem road, looking hour by hour upon those natural phenomena that suggested the parables. "London Men in Palestine" brings all this home to you as if you were a passer-by. Next, the massing of troops about the Holy City is described, and you are given a distant view of the city itself. A chapter follows that describes the coming of the rains. Then you spend a night in an old rock-engendered fortress-village while troops pass through to the attack, the storm still at its height. A chapter follows that tells of a crowded day—too complex and full of incident here to be described. The book closes with an exciting description of a fight on the Mount of Olives.

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